AD3

(Machine Code: A133)

IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the copier power cord is unplugged.
2. The wall outlet should be near the copier and easily accessible.
3. Note that some components of the copier and the paper tray unit are supplied with electrical voltage even if the main switch is turned off.
4. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
5. If the start key is pressed before the copier completes the warm-up period (Start key starts blinking red and green alternatively), keep hands away from the mechanical and the electrical components as the copier starts making copies as soon as the warm-up period is completed.
6. The inside and the metal parts of the fusing unit become extremely hot while the copier is operating. Be careful to avoid touching those components with your bare hands.

HEALTH SAFETY CONDITIONS

1. Never operate the copier without the ozone filters installed.
2. Always replace the ozone filters with the specified ones at the specified intervals.
3. Toner and developer are non-toxic, but if you get either of them in your eyes by accident, it may cause temporary eye discomfort. Try to remove with eye drops or flush with water as first aid. If unsuccessful, get medical attention.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The copier and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.

⚠ CATION

2. The RAM board on the system control board has a lithium battery which can explode if replaced incorrectly. Replace the battery only with an identical one. The manufacturer recommends replacing the entire RAM board. Do not recharge or burn this battery. Used batteries must be handled in accordance with local regulations.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Do not incinerate the toner bottle or the used toner. Toner dust may ignite suddenly when exposed to open flame.
2. Dispose of used toner, developer, and organic photoconductor according to local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.
4. When keeping used lithium batteries in order to dispose of them later, do not put more than 100 batteries per sealed box. Storing larger numbers or not sealing them apart may lead to chemical reactions and heat build-up.

LASER SAFETY

The Center for Devices and Radiological Health (CDRH) prohibits the repair of laser-based optical units in the field. The optical housing unit can only be repaired in a factory or at a location with the requisite equipment. The laser subsystem is replaceable in the field by a qualified Customer Engineer. The laser chassis is not repairable in the field. Customer engineers are therefore directed to return all chassis and laser subsystems to the factory or service depot when replacement of the optical subsystem is required.

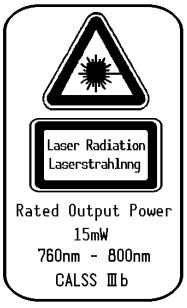
⚠ WARNING

Use of controls, or adjustment, or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

⚠ WARNING FOR LASER UNIT

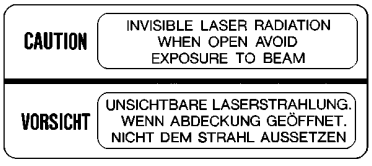
WARNING: Turn off the main switch before attempting any of the procedures in the Laser Unit section. Laser beams can seriously damage your eyes.

CAUTION MARKING:



For 115V version

For 230V version



SECTION 1

OVERALL MACHINE INFORMATION

1. SPECIFICATIONS

Configuration: Desktop

Copy Process: Dry electrostatic transfer system

Originals: Sheet/Book

Original Size: Maximum A3/11" x 17"

Copy Paper Size:
Maximum
A3/11" x 17" (Paper tray)
Minimum
A5/8 1/2" x 5 1/2" sideways (Paper tray)
A6/5 1/2" x 8 1/2" lengthwise (By-pass)
LCT
A4/11" x 8 1/2" sideways only

Duplex Copying:
Maximum
A3/11" x 17"
Minimum
A5/8 1/2" x 5 1/2" sideways

Copy Paper Weight:
Paper tray:
60 ~ 105 g/m^2, 16 ~ 24 lb
By-pass:
60 ~ 157 g/m^2, 16 ~ 42 lb
LCT:
60 ~ 128 g/m^2, 16 ~ 34 lb
Duplex copying:
64 ~ 105 g/m^2, 17 ~ 24 lb

Reproduction Ratios: 5 Enlargement and 7 Reduction

	A4/A3 Version	LT/DLT Version
Enlargement	400% 200% 141% 122% 115%	400% 200% 155% 129% 121%
Full size	100%	100%
Reduction	93% 87% 82% 71% 65% 50% 25%	93% 85% 77% 74% 65% 50% 25%

Zoom: 25% to 400% in 1% steps

Power Source: 120V/60Hz:
More than 12 A (for North America)
220V ~ 240V/50Hz:
More than 7 A (for Europe)
220V ~ 240V/60Hz:
More than 7 A (for Asia)

Power Consumption:

	Copier Only	Full System
Maximum	Less than 1.44 kW	Less than 1.44 kW
Copying	Less than 1.20 kW	Less than 1.20 kW
Warm-up	Less than 0.88 kW	Less than 0.90 kW
Stand-by	Less than 0.20 kW	Less than 0.22 kW

NOTE: 1) Full System: Copier + ADF + Paper Tray Unit + Finisher

Noise Emission:

	Copier Only	Full System
1. Sound Power Level		
Copying	66.0 dB(A)	69.0 dB(A)
Stand-by	40.0 dB(A)	40.0 dB(A)
2. Sound Pressure Level at the Operator Position		
Copying	54 dB(A)	59 dB(A)
Stand-by	25 dB(A)	25 dB(A)

NOTE: The above measurements are to be made in accordance with ISO 7779.
Full System: Copier + ADF + Paper Tray Unit + Finisher.

Dimensions (W x D x H): 880 x 655 x 602 mm (34.7" x 25.8" x 23.8")
Measurement Conditions
1) With by-pass feed table closed
2) With copy tray attached
3) With LCT cover closed
4) Without the 500-sheet copy tray

Weight: 95 kg (210 lb)

Copying Speed (copies/minute):

A4 sideways/ 11" x 8 1/2"	A3/11" x 17"	B4/8 1/2" x 14"
40	18	26

Warm-Up Time: Less than 140 seconds (20°C, 68°F)

First Copy Time: Less than 5.2 s (from LCT)

Copy Number Input: Ten-key pad, 1 to 999 (count up or count down)

Manual Image Density Selection: 7 steps

Automatic Reset: 30 s is the standard setting; it can be changed with a UP mode.

Copy Paper Capacity:

Paper Tray	By-pass Feed	LCT
About 500 sheets x1	About 40 sheets	About 1000 sheets

Hard Disk: 1 GB, Fast SCSI-2

Duplex Tray Capacity: A4/11" x 8 1/2": 50 sheets
A3/11" x 17": 50 sheets (80 g/m^2, 20 lb paper)
30 sheets (81 ~ 105 g/m^2, 21.5 ~ 27.9 lb paper)

Toner Replenishment: Cartridge exchange (700 g/cartridge)

Toner Yield: 20K copies (A4, 6% full black, ID Level 4)

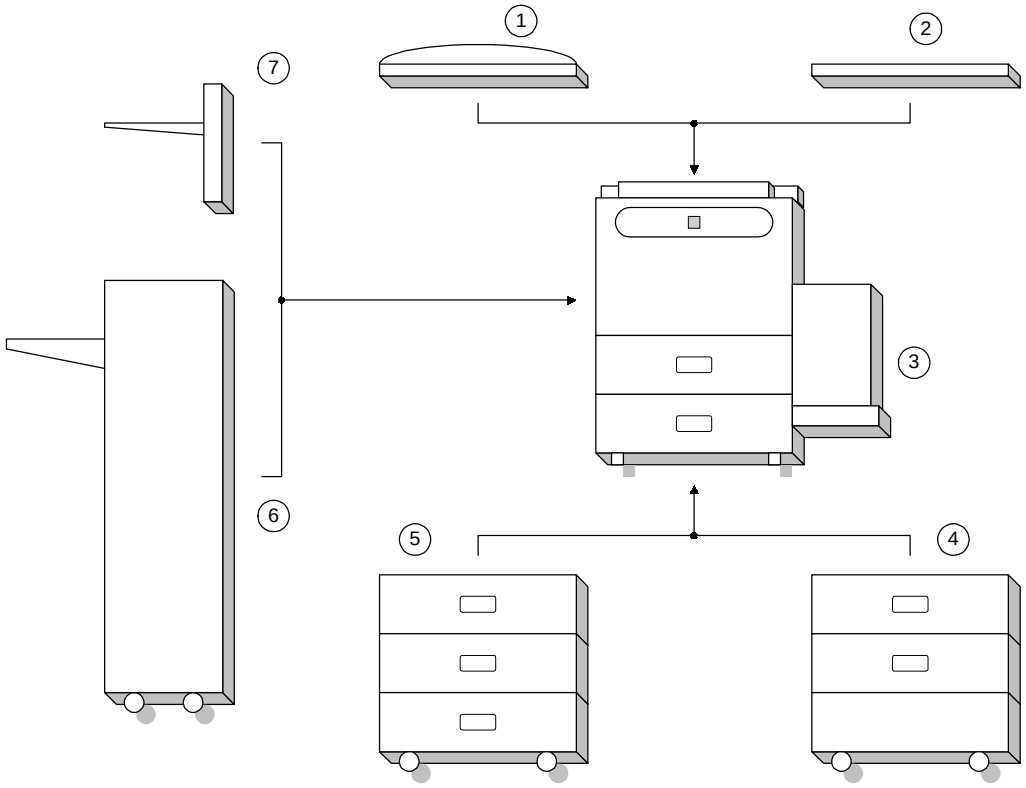
Optional Equipment:

- Platen cover
- Document feeder
- Paper tray unit with two paper trays
- Paper tray unit with three paper trays
- Finisher
- Key counter
- Tray heater
- Optical anti-condensation heater
- Drum heater
- 500-sheet receiving tray

Copy Tray Capacity:

B4/8 1/2" x 14" ~ A4/8 1/2" x 11"	500 sheets
A3\11" x 17"	200 sheets
Less than B5/5 1/2" x 8 1/2":	200 sheets

2. MACHINE CONFIGURATION



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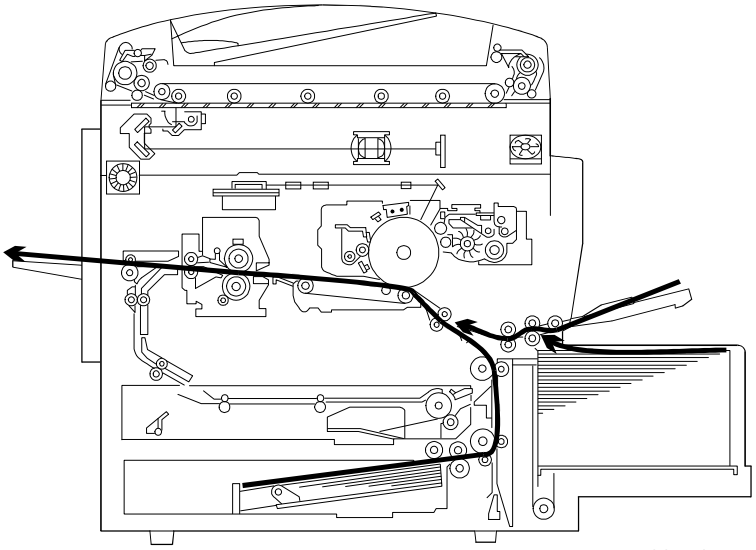
Item	Machine Code	No.
Copier	A133	3
ADF (Option)	A548	1
Paper Feed Unit (Option)	A549	5
	A550	4
Finisher (Option)	A612	6
500-sheet Receiving Tray (Option)	A615	7
Platen Cover (Option)	A381	2

3. PAPER PATH

3.1 NORMAL COPYING



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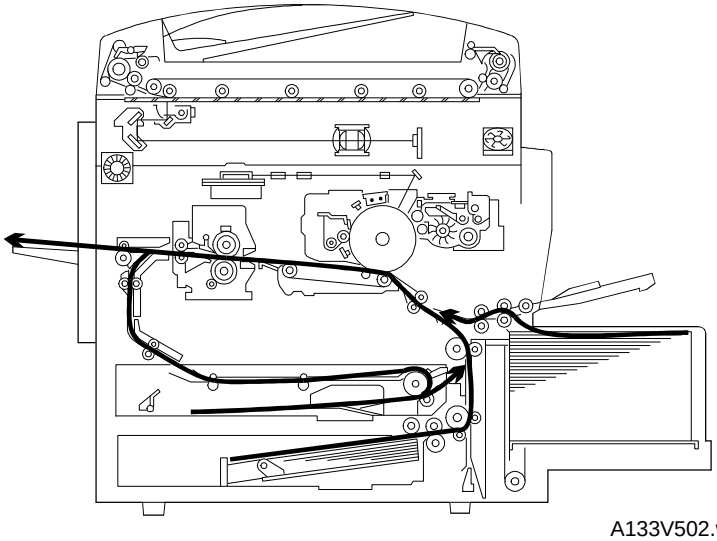
3.2 DUPLEX COPYING



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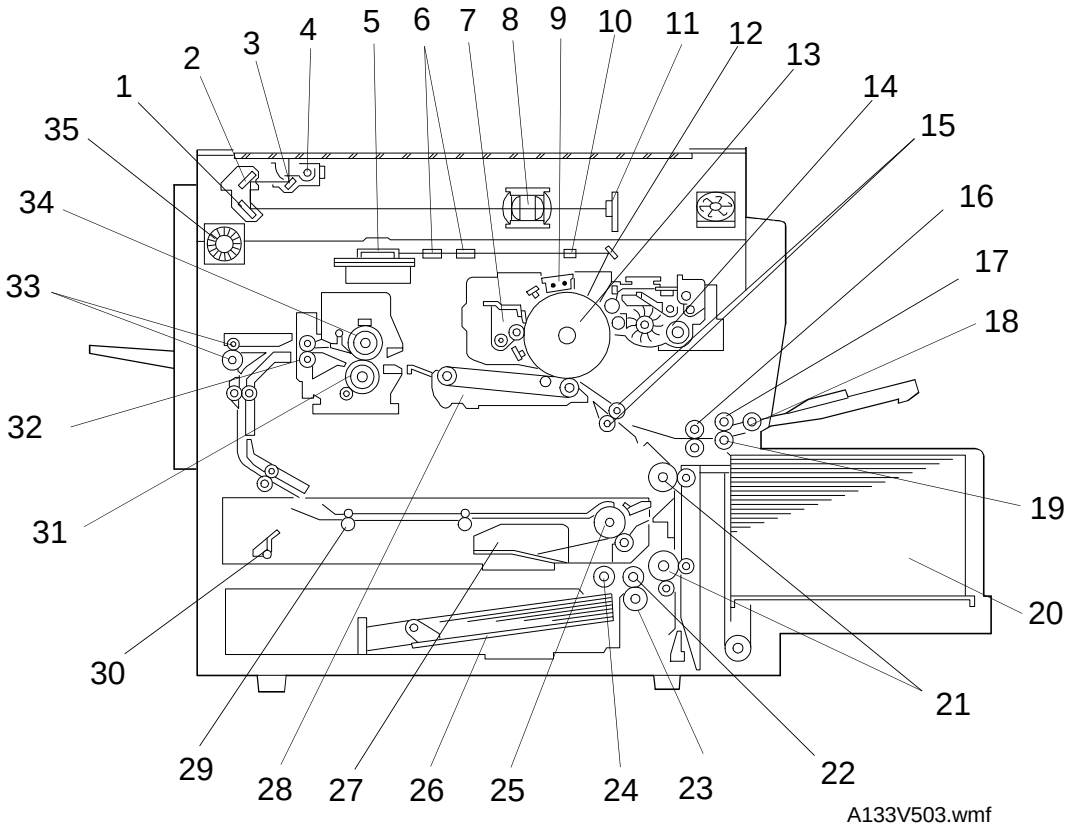
4. MECHANICAL COMPONENT LAYOUT



1. 3rd. Mirror
2. 2nd. Mirror
3. 1st. Mirror
4. Exposure Lamp
5. Polygonal Mirror Motor
6. Fθ Lenses
7. Cleaning Unit
8. Lens
9. Charge Corona Unit
10. Barrel Toroidal Lens (BTL)
11. CCD
12. Mirror
13. Drum
14. Development Unit
15. Registration Rollers
16. By-pass Feed Relay Roller
17. By-pass Feed Roller
18. By-pass Pick-up Roller
19. By-pass Separation Roller
20. LCT
21. Relay Rollers
22. Feed Roller
23. Separation Roller
24. Pick-up Roller
25. Duplex Feed Roller
26. Bottom Plate
27. Side Jogger Fence
28. Transfer Belt Unit
29. Entrance Rollers
30. End Jogger Fence
31. Pressure Roller
32. Fusing Exit Roller
33. Exit Rollers
34. Hot Roller
35. Optics Exhaust Fan Motor

5. ELECTRICAL COMPONENT DESCRIPTIONS

Refer to the electrical component layout and the point-to-point diagram on the waterproof paper in the pocket for the locations of these components.

Symbol	Index No.	Description	Note
Printed Circuit Boards			
PCB1	90	SCU	Controls all copier functions both directly or through other control boards.
PCB2	89	AC Drive	Provides ac power to the exposure lamp and fusing lamps.
PCB3	92	DC Power Supply	Provides dc power.
PCB4	93	BCU	Controls the mechanical parts of the printer.
PCB5	80	Charge High Voltage Supply	Supplies high voltage to the charge corona unit.
PCB6	85	High Voltage Control	Controls the high voltage boards and the quenching lamp.
PCB7	87	Operation Panel	Controls the touch panel display and LED matrix, and monitors the key matrix.
PCB8	79	Scanner Drive	Drives the scanner motor.
PCB9	81	EX-IPU	Processes the video signal from the SBU and sends the video signal to the LD unit.
PCB10	84	SBU	Contains the CCD, and outputs a video signal to the EX-IPU board.
PCB11	94	Lamp Stabilizer	Provides dc power for the exposure lamp.
PCB12	86	Main Scan Synchronization Detector - 1	Detects the laser beam at the start of the main scan.
PCB13	83	Main Scan Synchronization Detector - 2	Detects the laser beam at the end of the main scan.
PCB14	31	Transfer High Voltage	Supplies high voltage to the transfer belt.
PCB15	33	Development Bias Power Pack	Supplies high voltage to the development roller.
PCB16	40	Duplex Control	Controls the operation of the duplex tray.
PCB17	N/A	Liquid Crystal Display	Controls the guidance display and displays guidance for machine operation.
PCB18	51	LCT Interface	Interfaces the LCT control signal between the main board and the LCT.
PCB19	91	Relay Board	Switches ac power to either the dc drive board (if the main switch is on) or to the heaters (if the main switch is off).
PCB20	7	Laser Diode Drive	Controls the laser diode.
Motors			
M1	57	Main	Drives the main body components.
M2	66	Toner Bottle Drive	Rotates the toner bottle to supply toner to the toner supply unit.

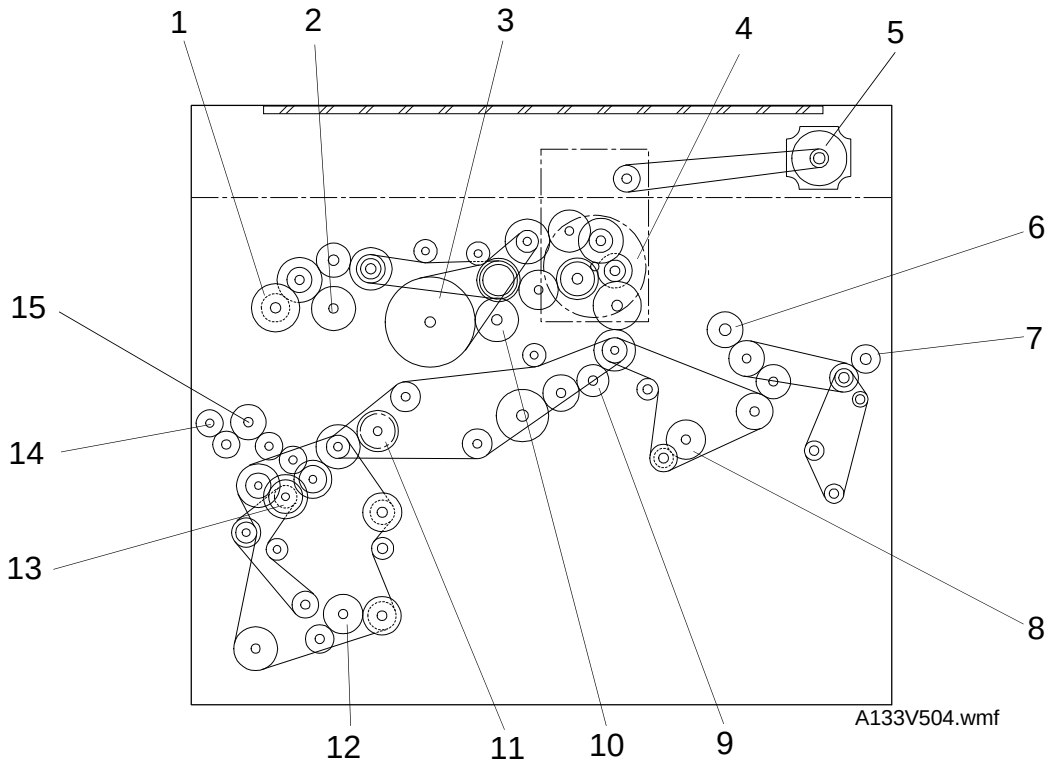
Symbol	Index No.	Description	Note
M3	73	Tray Lift	Raises the bottom plate in the paper tray.
M4	56	Polygonal Mirror	Turns the polygonal mirror.
M5	48	LCT Lift	Lifts up and lowers the LCT bottom plate.
M6	74	Optics Exhaust Fan	Removes heat from the optics unit.
M7	65	IPU Fan	Removes heat from the IPU board.
M8	78	Exhaust Fan	Removes heat from around the fusing unit.
M9	60	Ozone Fan	Removes ozone-laden air from inside the machine.
M10	55	Scanner Drive	Drives the 1st and 2nd scanners (dc stepper motor).
M11	36	Duplex Feed	Drives the feed roller and moves the bottom plate up and down.
M12	39	End Fence Jogger	Drives the end fence jogger to square the paper stack.
M13	38	Side Fence Jogger	Drives the side fence jogger to square the paper stack.
M14	75	DC Drive Board Fan	Removes heat from around the DC drive board.
M15	68	Charge Inlet Fan	Provides air flow around the charge corona unit section.
Sensors			
S1	13	By-pass Feed Paper Width	Informs the CPU what width paper is in the by-pass feed table.
S2	15	By-pass Feed Paper End	Informs the CPU that there is no paper in the by-pass tray.
S3	18	Tray Paper End	Informs the CPU when the paper tray runs out of paper.
S4	46	Upper Relay	Detects the leading edge of paper from the paper tray and duplex unit to determine the stop timing of the paper feed clutch and duplex feed motor. Also detects misfeeds.
S5	16	Tray Upper Limit	Detects the height of the paper stack in the paper tray to stop the upper tray lift motor.
S6	47	Lower Relay	Detects misfeeds.
S7	49	LCT Lower Limit	Sends a signal to the CPU to stop lowering the LCT bottom plate.
S8	50	LCT Paper End	Informs the CPU when the LCT runs out of paper.
S9	12	LCT Upper Limit	Signals the CPU to stop lifting the LCT bottom plate.
S10	19	Registration	Detects the leading edge of the copy paper to determine the stop timing of the paper feed clutch, and detects misfeeds.
S11	29	Image Density (ID)	Detects the density of various patterns on the drum during process control.
S12	30	Toner Density (TD)	Detects the amount of toner inside the development unit.

Symbol	Index No.	Description	Note
S13	1	Scanner HP	Informs the CPU when the 1st and 2nd scanners are at the home position.
S14	8	Original Length-1	Detects the length of the original. This is one of the APS (Auto Paper Select) sensors.
S15	9	Original Length-2	Detects the length of the original. This is one of the APS (Auto Paper Select) sensors.
S16	24	Fusing Exit	Detects misfeeds.
S17	6	Platen Cover	Informs the CPU whether the platen cover is up or down (related to APS/ARE functions). ARE: Auto Reduce and Enlarge
S18	32	Toner End	Instructs the CPU to add toner to the toner supply unit, and detects toner end conditions.
S19	28	Auto Response	Returns the operation panel display and exits from the energy saver mode.
S20	10	Transfer Belt Position	Informs the CPU of the current position of the transfer belt unit.
S21	2	Original Width	Detects the width of the original. This is one of the APS (Auto Paper Select) sensors.
S22	34	Duplex Paper End	Detects paper in the duplex tray.
S23	35	Duplex Turn	Detects the trailing edge of the copy paper to determine the jogging timing, and detects misfeeds.
S24	42	Duplex Entrance	Detects misfeeds.
S25	37	Side Fence Jogger HP	Detects the home position of the duplex side fence jogger.
S26	41	End Fence Jogger HP	Detects the home position of the duplex end fence jogger.
S27	23	Toner Overflow	Detects when the used toner collection bottle is full.
S28	14	By-pass Relay	Detects misfeeds.
Switches			
SW1	11	By-pass Feed Table	Detects whether the by-pass feed table is open or closed.
SW2	53	Tray Down	Sends a signal to the CPU to lower the LCT bottom plate.
SW3	20	Tray Paper Size	Determines what size of paper is in the paper tray.
SW4	54	LCT	Cuts the dc power line and detects whether the LCT is open or not.
SW5	52	LCT Cover	Cuts the dc power line of the LCT lift motor.
SW6	27	Main	Supplies power to the copier.
SW7	26	Front Cover Safety	Cuts the dc power line and detects whether the front cover is open or not.
Magnetic Clutches			
CL1	61	Toner Supply	Turns the toner supply roller to supply toner to the development unit.
CL2	59	Development	Drives the development roller.

Symbol	Index No.	Description	Note
CL3	76	Transfer Belt Lift	Controls the touch and release movement of the transfer belt unit.
CL4	58	Registration	Drives the registration rollers.
CL5	63	By-pass Feed	Starts paper feed from the by-pass feed table or LCT.
CL6	71	Relay	Drives the relay rollers.
CL7	72	Paper Feed	Starts paper feed from the paper tray.
CL8	62	By-pass Relay	Drives the by-pass relay rollers.
Solenoids			
SOL1	67	By-pass Pick-up	Drops the pick-up roller to the by-pass paper feed position. When paper is fed from the LCT, this solenoid assists SOL3.
SOL2	77	Junction Gate	Moves the junction gate to direct copies to the duplex tray or to the paper exit.
SOL3	64	LCT Pick-up	Drops the pick-up roller all the way down to the LCT paper feed position from the by-pass paper feed position.
SOL4	69	Pick-up	Controls the up/down movement of the pick-up roller in the paper tray.
SOL5	70	Separation	Controls the up/down movement of the separation roller at the paper tray feed station.
Lamps			
L1	3	Exposure	Applies high intensity light to the original for exposure.
L2	43	Fusing	Provides heat to the hot roller.
L3	88	Quenching	Neutralizes any charge remaining on the drum surface after cleaning.
Heaters			
H1	21	Drum (option)	Turns on when the main switch is off to prevent moisture from forming around the drum.
H2	5	Optics Anti-condensation (option)	Turns on when the main switch is off to prevent moisture from forming on the optics.
H3	22	Tray (option)	Turns on when the main switch is off to keep paper dry in the paper tray.
Thermistors			
TH1	45	Fusing	Monitors the temperature at the central area of the hot roller.
Thermofuses			
TF1	44	Fusing	Provides back-up overheat protection in the fusing unit.
Thermoswitch			
TS1	4	Exposure Lamp	Opens the exposure lamp circuit if the 1st scanner overheats.

Symbol	Index No.	Description	Note
Counters			
CO1	25	Total	Keeps track of the total number of copies made.
CO2	N/A	Key (option)	Used for control of authorized use. The copier will not operate until it is installed.
Others			
CB1	17	Circuit Breaker (220 ~ 240V machines only)	Provides back-up high current protection for electrical components.
HDD	82	Hard Disk Drive	Scanned image data is compressed and held here temporarily during copying; also holds user stamp data.

6. DRIVE LAYOUT



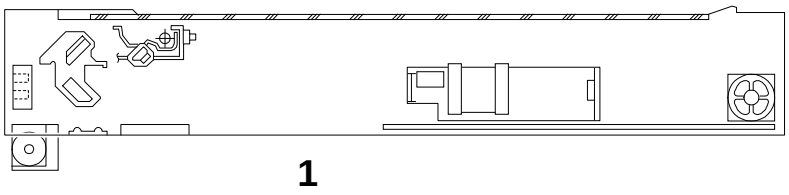
1. Toner Supply Clutch
2. Development Clutch
3. Drum Drive Pulley
4. Main Motor
5. Scanner Drive Motor
6. Fusing Drive Gear
7. Exit Drive Gear
8. Toner Collection Bottle Drive Gear
9. Transfer Belt Drive Gear
10. Cleaning Blade Drive Gear
11. Registration Clutch
12. Paper Feed Clutch
13. Relay Clutch
14. By-pass Feed Clutch
15. By-pass Relay Clutch

SECTION 2

DETAILED
SECTION DESCRIPTIONS

1. COPY PROCESS

1.1 OVERVIEW



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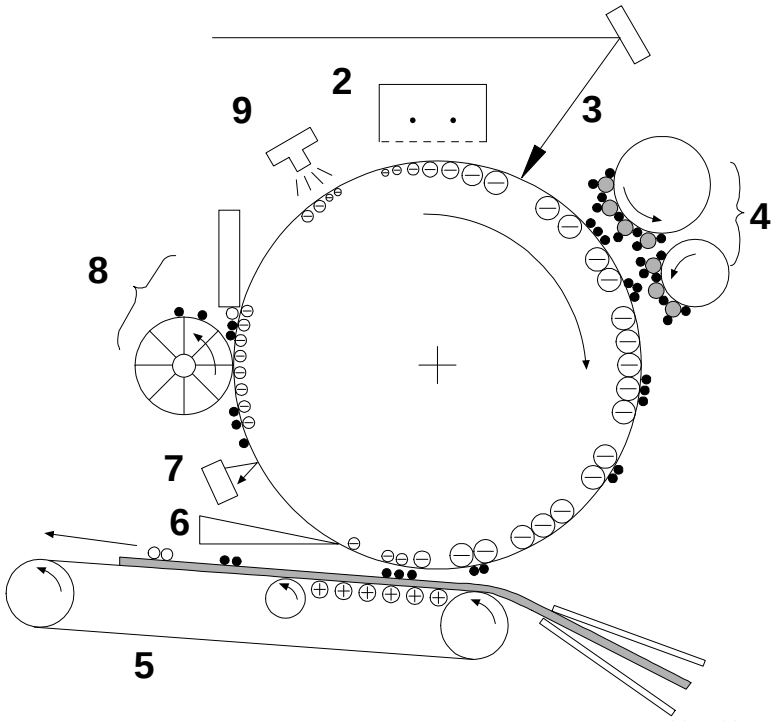

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1. EXPOSURE
A halogen lamp exposes the original. Light reflected from the original passes to the CCD, where it is converted into an analog data signal. This data is converted to a digital signal, processed, and stored on the hard disk. At the time of printing, the data is retrieved and sent to the laser diode. For multi-copy runs, the original is scanned once only and stored to the disk.

2. DRUM CHARGE
In the dark, the charge corona unit gives a negative charge to the organic photo-conductive (OPC) drum. The grid plate ensures that corona charge is applied uniformly. The charge remains on the surface of the drum because the OPC layer has a high electrical resistance in the dark.

3. LASER EXPOSURE
The processed data scanned from the original is retrieved from the disk and transferred to the drum by a laser beam, which forms an electrical latent image on the drum surface. The amount of charge remaining as a latent image on the drum depends on the laser beam intensity, which is controlled by the EX-IPU board.

4. DEVELOPMENT
The magnetic developer brush on the development rollers comes in contact with the latent image on the drum surface. Toner particles are electrostatically attracted to the areas of the drum surface where the laser reduced the negative charge on the drum.

5. IMAGE TRANSFER
Paper is fed to the area between the drum surface and the transfer belt at the proper time so as to align the copy paper and the developed image on the drum surface. Then, the transfer bias roller applies a high positive charge to the reverse side of paper through the transfer belt. This positive charge produces an electrical force which pulls the toner particles from the drum surface on to the paper. At the same time, the paper is electrically attracted to the transfer belt.

6. PAPER SEPARATION
Paper separates from the drum as a result of the electrical attraction between the paper and the transfer belt. The pick-off pawls help separate the paper from the drum.

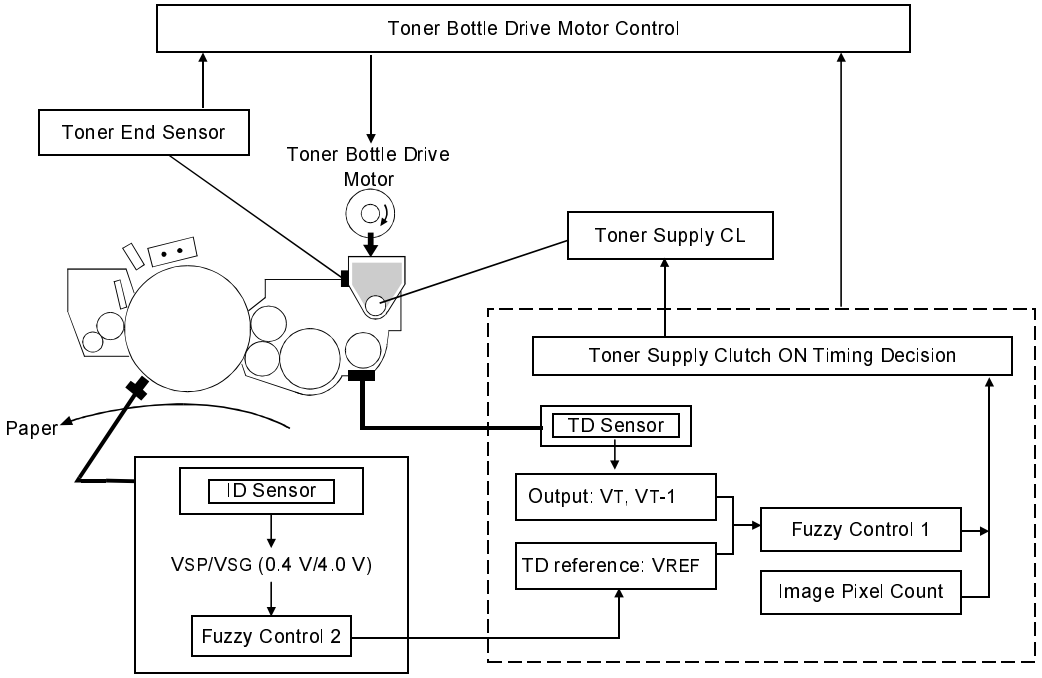
7. ID SENSOR
On every 200th copy cycle, the laser forms a sensor pattern on the drum surface. The ID sensor measures the reflectivity of the pattern. The output signal is one of the factors used for toner supply control.

8. CLEANING
The cleaning brush and cleaning blade remove any toner remaining on the drum surface after the image is transferred to the paper.

9. QUENCHING
The light from the quenching lamp electrically neutralizes the charge on the drum surface.

2. PROCESS CONTROL

2.1 OVERVIEW



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In this model, process control consists only of monitoring the toner density (with a correction from the ID sensor) in order to control the toner concentration and toner supply amount.

The machine controls the toner supply mechanism using readings from the toner density sensor (TD sensor) and image density sensor (ID sensor).

Readings from the TD sensor are used to keep the toner concentration in the developer at a constant level. However, the toner concentration on the image on the drum varies due to variations in toner chargeability, which is influenced by the environment and the status of the carrier, even if the toner concentration is constant. Because of this, readings from the ID sensor are used to change the toner concentration to keep the image density of the reference pattern on the drum constant.

2.2 TONER DENSITY CONTROL

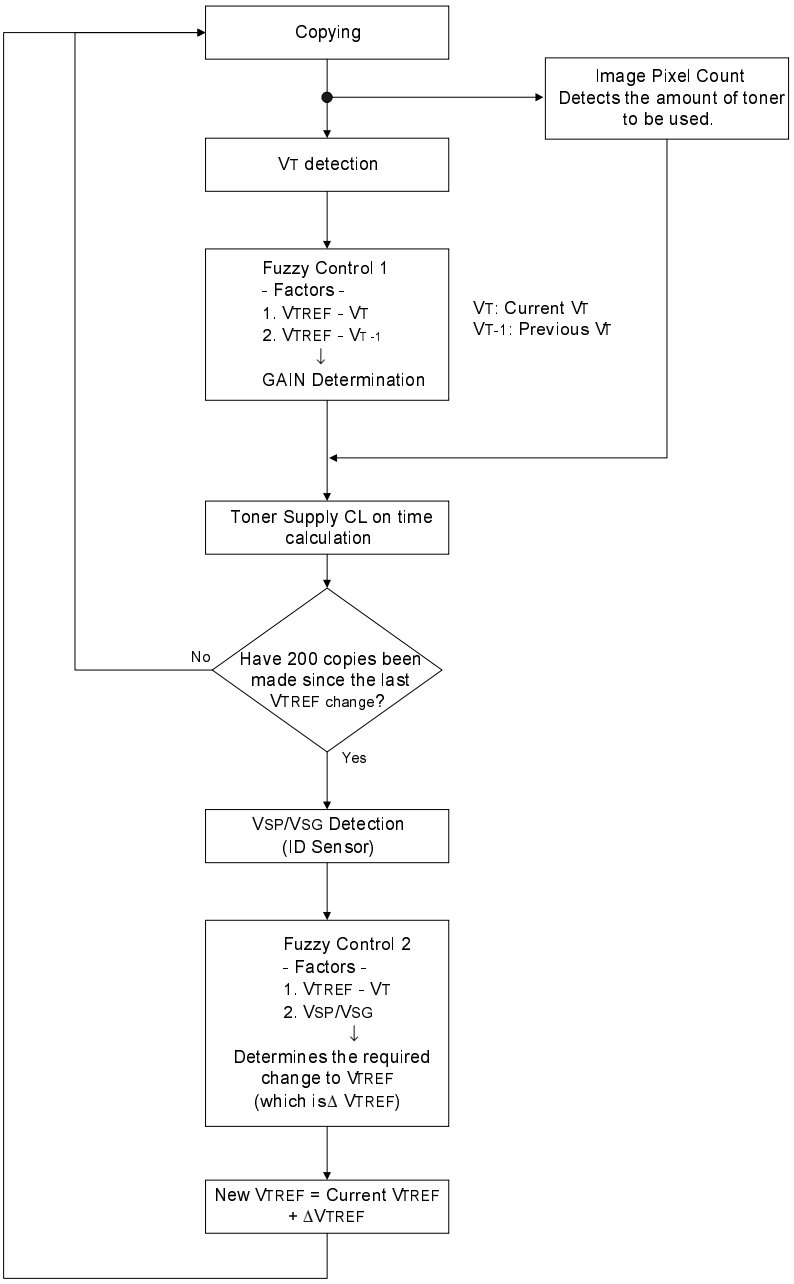
2.2.1 Overview

There are two modes for controlling toner supply: detect supply mode and fixed supply mode.

The mode can be changed with SP2208-1. The factory setting is detect supply mode.

2.2.2 Detect Supply Mode

Overview


Copying
Image Pixel Count
Detects the amount of toner to be used.
VT detection
Fuzzy Control 1
- Factors -
1. VTREF - VT
2. VTREF - VT -1
GAIN Determination
VT: Current VT
VT-1: Previous VT
Toner Supply CL on time calculation
No
Have 200 copies been made since the last VTREF change?
Yes
VSP/VSG Detection (ID Sensor)
Fuzzy Control 2
- Factors -
1. VTREF - VT
2. VSP/VSG
Determines the required change to VTREF (which is Δ VTREF)
New VTREF = Current VTREF + ΔVTREF

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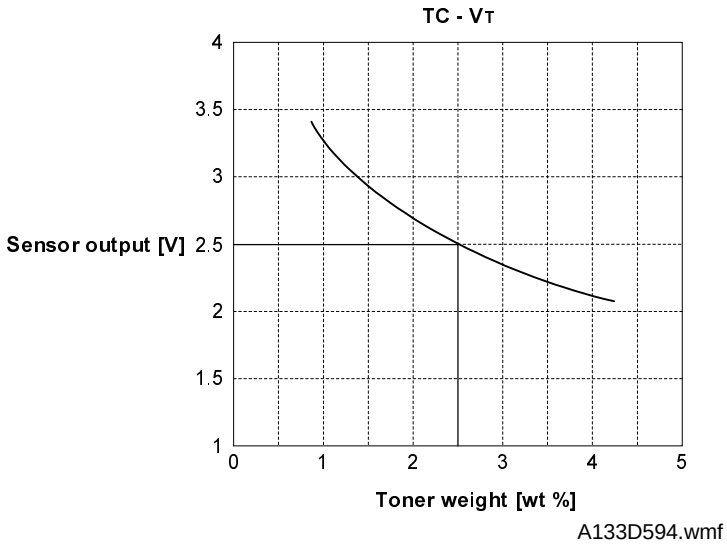
In detect supply mode, the machine varies toner supply for each copy based on the amount of toner required to print the page (based on a black pixel count for the page) and readings from the TD and ID sensors to maintain the correct proportion of toner in the developer and to account for changes in drum reflectivity over time.

The flow chart on the previous page outlines the detect supply mode. Each step is explained in more detail on the following pages.

Toner Density Sensor



Developer consists of carrier particles (ferrite) and toner particles (resin and pigment). Inside the development unit, developer passes through a magnetic field created by coils inside the toner density sensor. When the toner concentration changes, the voltage output by the sensor changes accordingly.

The output from the sensor (V_T) is checked every copy. The machine tries to keep V_T constant by varying the toner supply using a fuzzy logic process, as shown in the flow chart on the previous page.

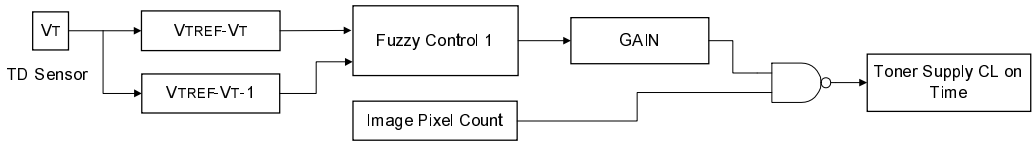
Toner Density Sensor Initial Setting

When new developer with the standard toner concentration (2.5% by weight, 21.25 g of toner in 850 g of developer) is installed, the TD sensor initial setting must be done using SP mode 2801. This sets the sensor output to 2.5 $\pm$ 0.1 V. This value will be used as the toner supply reference voltage (V_{TREF}) of the TD sensor.

Toner Density Measurement

Toner density in the developer is detected once every copy cycle. The sensor output voltage (V_T) during the detection cycle is compared with the toner supply reference voltage (V_{TREF}).

Toner Supply Clutch On Time Calculation



A133D540.wmf

- Fuzzy Control Process 1 -

To stabilize toner concentration, the toner supply amount (controlled by the toner supply clutch on time) is determined by referring to V_{TREF} and V_T.

The toner supply amount is calculated every copy using the following factors.

Factor 1: $V_{TREF} - V_T$

Factor 2: $V_{TREF} - V_{T-1}$

- V_{TREF}: TD sensor output at the latest V_{SP} detection corrected for ID sensor output (V_{SP}/V_{SG}); this is calculated every 200 copies (see V_{TREF} calibration for more details). For new developer, the TD sensor initial setting is used.
- V_T: Current TD sensor output data
- V_{T-1}: Previous TD sensor output data

By referring to these factors, the machine recognizes the difference between the current toner concentration and the target toner concentration. It then determines the GAIN value for calculating the toner supply clutch on time.

- Image Pixel Count -

The CPU refers to the solid area ratio for the whole page informed from the EX-IPU to improve the precision of the toner density change prediction. The CPU converts the image data value of each pixel to the toner supply amount. Therefore, the machine understands by how much the toner supply amount will probably change.

- Toner Supply Clutch On Time Calculation -

The toner supply clutch on time is decided using value of the gain which was calculated by the fuzzy control 1 procedure, the image pixel count value, the possible amount of toner on the drum, and the toner supply rate. The calculation is done using the following formula:

$$\text{Toner supply CL on time} = \frac{\text{GAIN x Image pixel count x } 0.7\ {}^{mg}/_{cm^2}}{\text{Toner supply rate } (116\ {}^{mg}/_{s})}$$

NOTE: The toner supply rate can be changed with SP2209. For example, if the user commonly makes copies with a lot of black areas, reduce the value stored in SP2209.

V_{TREF} Calibration

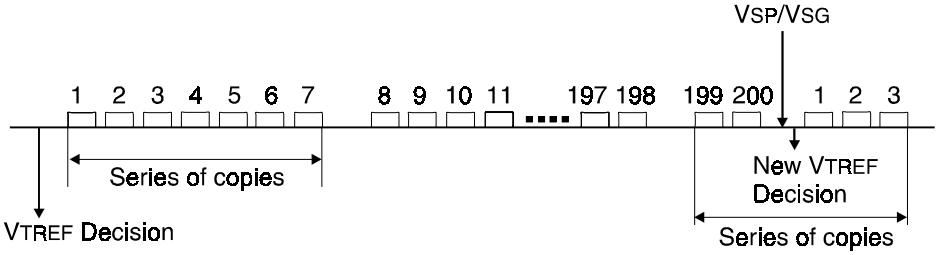
- V_{SP} and V_{SG} Detection -

The ID sensor (below the drum cleaning section) detects the following voltages.

- V_{SG}: The ID sensor output when checking the drum surface.
- V_{SP}: The ID sensor output when checking the V_{SP} pattern.

In this way, the reflectivity of both the drum surface and the pattern on the drum are checked. This compensates for any variations in the reflectivity of the pattern on the drum or the reflectivity of the drum surface.

The V_{SP} pattern is made on the drum by the charge corona unit and the laser diode.

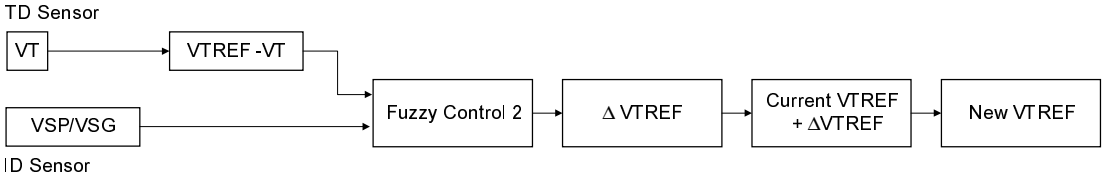


A133D541.wmf

V_{SP}/V_{SG} detection is performed every 200 copies to decide the new V_{TREF}. The value of the copy counter for the V_{SP}/V_{SG} detection is stored in the NVRAM (Non-volatile RAM) on the SCU board. So, even if the machine is switched off, the copy count starts from the number which was stored in the NVRAM. In addition, as the diagram shows, the new V_{TREF} will take effect even if the 200th copy occurs in the middle of a copy run; however, the overall cpm for this copy run will be lower because of the copy cycle required to make the ID sensor pattern.

- New V_{TREF} Determination -

Even if the toner concentration in the developer is kept constant by checking the TD sensor, the toner potential (chargeability) and the image density change with humidity and the amount of toner on the carrier.
Therefore, the ID sensor output is also used as one of the factors for deciding the new V_{TREF} which will be used for toner density control.



A133D542.wmf

First of all, the CPU decides the adjustment that is required to the current V_{TREF} (ΔV_{TREF}) with the fuzzy control 2 procedure using the following factors.

- V_{TREF} - V_T
- V_{SP}/V_{SG}

Then, the CPU determines the new V_{TREF} using the following formula.

New V_{TREF} = V_{TREF} + ΔV_{TREF}

From this point, toner density control is done using the new V_{TREF}.

If V_{TREF} is either higher than 4.0 V or less than 0.5 V on more than 10 consecutive occasions, the GAIN value is fixed at 0.7 (see the equation at the end of the "Toner Supply Clutch On Time Calculation" section). Then, after finishing the copy job, SC390 will be generated.

2.2.3 Fixed Supply Mode

The machine supplies a fixed amount of toner every copy. The amount depends on the setting of SP2208-2 (for users who normally make copies with a lot of black areas, use a higher setting). Readings from the TD and ID sensors are ignored.

Fixed supply mode should only be used as a temporary measure while waiting for replacement parts, such as a TD sensor. The machine does not fall back to fixed supply mode when there are sensor errors.

2.2.4 Toner Supply in Abnormal Sensor Conditions

Overview

Under normal conditions, the machine uses detect supply mode, in which toner supply is varied based on readings from the TD and ID sensors.

The TD sensor is checked every copy. If the readings from the TD sensor become abnormal during a copy job, the machine holds the GAIN factor constant (GAIN is normally calculated from TD sensor readings) to allow toner supply to vary with only pixel count for the rest of the copy job. Then at the end of the copy job, an SC code is generated and the machine must be repaired. There is no fallback to fixed supply mode in this model.

The ID sensor is checked every 200 copies. If readings become abnormal, an SC code is generated and the machine must be repaired. If this happens during a copy job, V_{TREF} is not changed, the copy job is allowed to finish, and then the SC code is generated.

Details of abnormal sensor detection follow below.

Abnormal TD Sensor Output (during normal operation and V_{TREF} determination)

When V_T has been more than 4.0 V or less than 0.5 V on ten consecutive occasions, the CPU fixes the value of the GAIN factor in the toner supply clutch on time formula to 0.7. Then the toner is supplied in accordance with the value of the image pixel count data. After finishing the copy job, SC390 will be generated.

Also, SC390 is generated when the difference between V_T and V_{TREF} has been more than 0.6 V ten times.

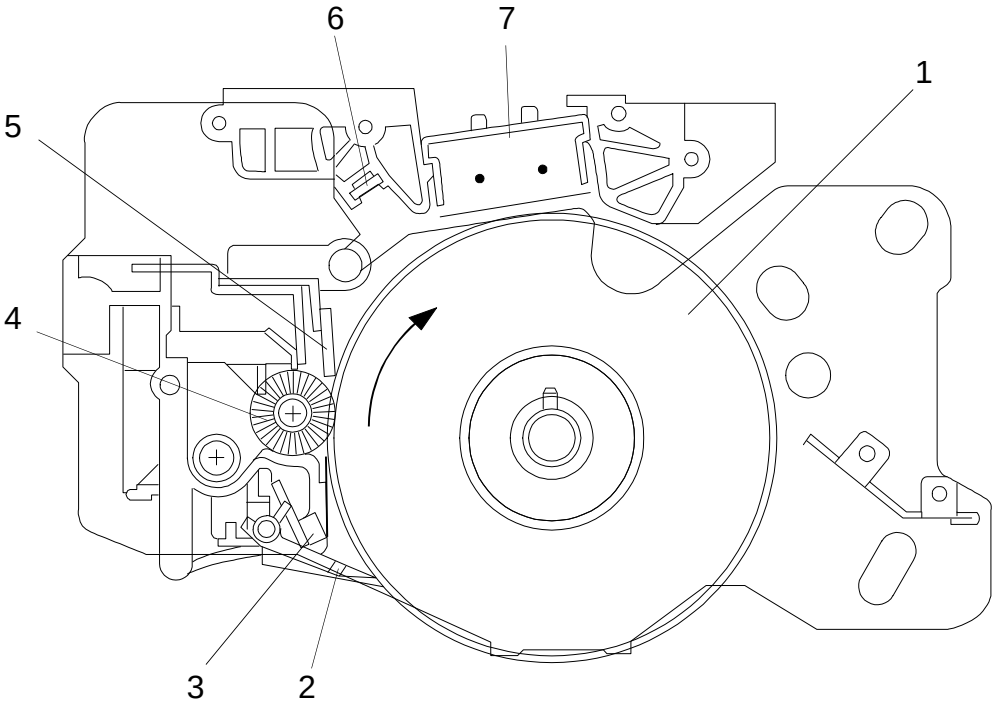
Abnormal ID Sensor Output (during V_{SP}/V_{SG} measurement)

When $V_{SP} \geq 2.5V$ or $V_{SG} \leq 2.5V$ twice consecutively, SC350 will be generated. At this time, V_{TREF} remains at the previous value.

Also, SC350 is generated if V_{SG} cannot be adjusted to $4 \pm 0.2V$ during ID sensor initialization (SP3001: this is done after installing a new drum or a new ID sensor, or after cleaning the ID sensor).

3. DRUM UNIT

3.1 OVERVIEW



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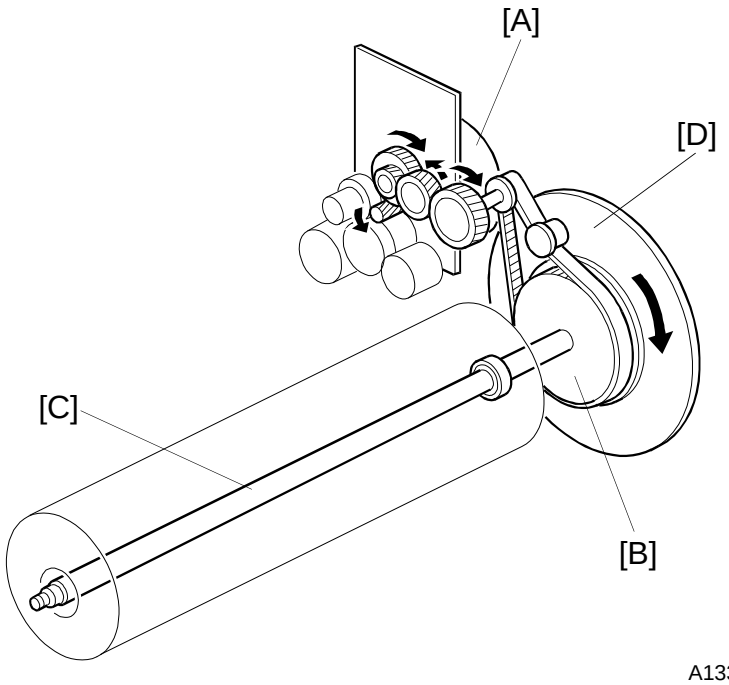
The drum unit consists of the components shown in the above illustration. An organic photoconductor (OPC) drum (diameter: 100 mm) is used in this model.

1. OPC Drum
2. Pick-off Pawls
3. ID Sensor
4. Cleaning Brush
5. Cleaning Blade
6. Quenching Lamp
7. Charge Corona Unit

3.2 DRIVE MECHANISM



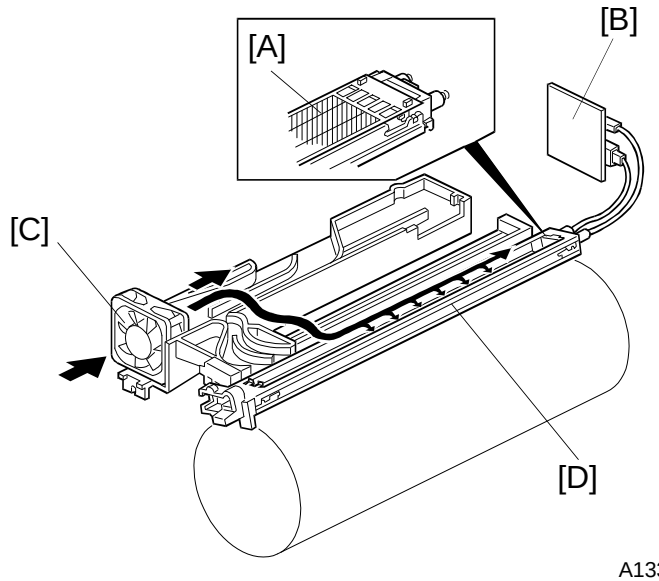
A133D501.wmf

The drive from the main motor [A] is transmitted to the drum through a series of gears, a timing belt, the drum drive pulley [B], and the drum shaft [C]. The main motor has a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range.

The fly-wheel [D] on the end of the drum shaft stabilizes the rotation speed (this prevents banding from appearing and jitter on copies).

The drum rotation speed is 150 mm/s.

3.3 DRUM CHARGE



A133D502.wmf

This copier uses a double corona wire (single loop type) scorotron system for charging the drum.

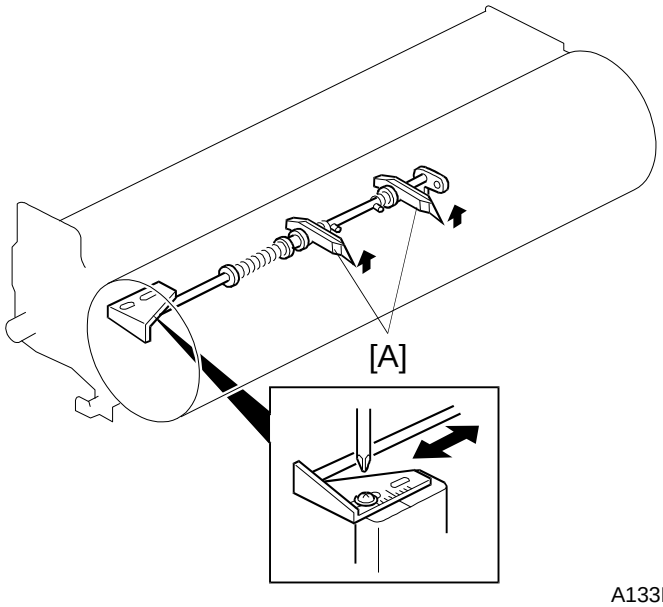
The two corona wires apply negative charge to the drum surface. The stainless steel grid plate [A] makes the corona charge uniform. The negative voltage on this grid controls the amount of negative charge on the drum.

The charge high voltage supply board [B] gives a constant corona current to the corona wires, and applies –890V to the grid plate. The grid plate voltage maintains a constant charge on the drum surface even when the wire current varies.

The ozone fan [C] provides a flow of air through the corona unit [D] in order to prevent an uneven build up of negative ions. This helps maintain an even image density.

A replacement charge corona unit with wire cleaner and motor is available as an optional service part for machines which produce a high copy volume.

3.4 PICK-OFF PAWLS



A133D504.wmf

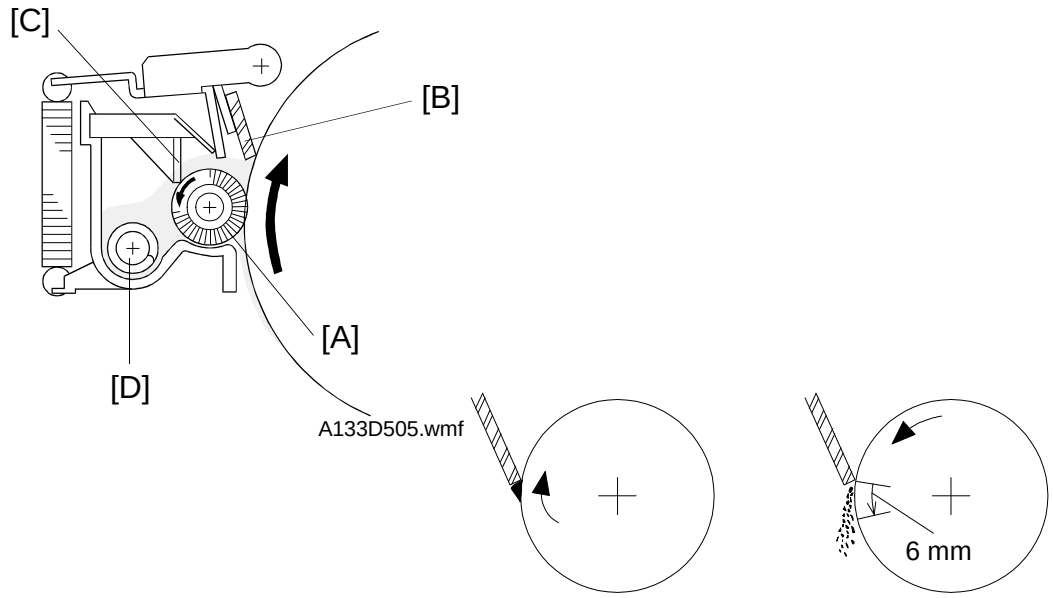
There are two pick-off pawls [A] under the cleaning unit.

The pick-off pawls help to separate the copy paper from the drum, and they are always in contact with the drum surface under a weak spring pressure.

The position of the pick-off pawls can be changed manually to prevent drum damage at an early stage caused by contact with the pick-off pawls. Change the position if lines are already beginning to appear on the drum at the pick-off pawl position at the first PM.

3.5 DRUM CLEANING

3.5.1 OVERVIEW



A113D513.wmf

The cleaning brush [A] and cleaning blade [B] remove any toner remaining on the drum after the image is transferred to the paper. This model uses a counter blade system.

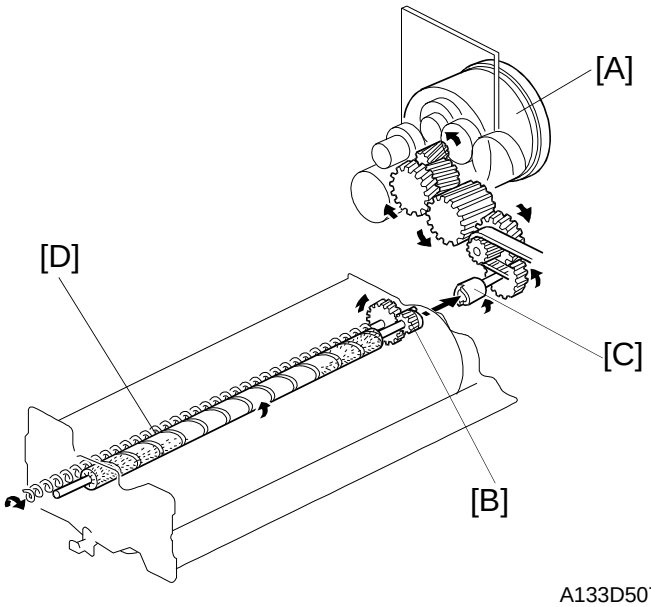
To reduce the wear on the drum, the cleaning brush and the drum move in the same direction at their point of contact, unlike previous models.

The main purpose of the cleaning brush is to improve the cleaning efficiency of the cleaning blade, by spreading out any leftover toner on the drum before it reaches the blade.

Toner scraped off by the cleaning blade will fall onto the cleaning brush, which will then be scraped off by the brush flicker [C] to be carried away by the toner collection coil [D].

To remove the toner and other particles that are accumulated at the edge of the cleaning blade, the drum turns in reverse for about 6 mm at the end of every copy job as shown in the illustration.

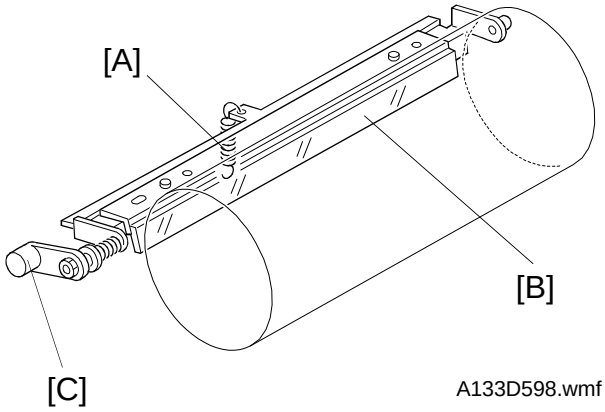
3.5.2 DRIVE MECHANISM



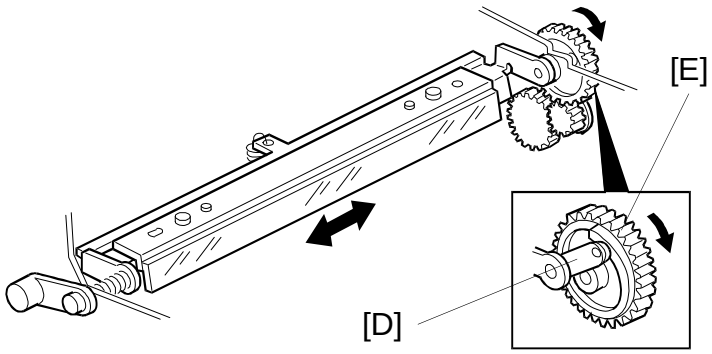
A133D507.wmf

Drive from the main motor [A] is transmitted to the cleaning brush gear [B] via a series of gears, a timing belt, and the joint gear [C]. The cleaning brush gear then transmits the drive to the toner collection coil [D].

3.5.3 CLEANING BLADE PRESSURE MECHANISM AND SIDE-TO-SIDE MOVEMENT



A133D598.wmf

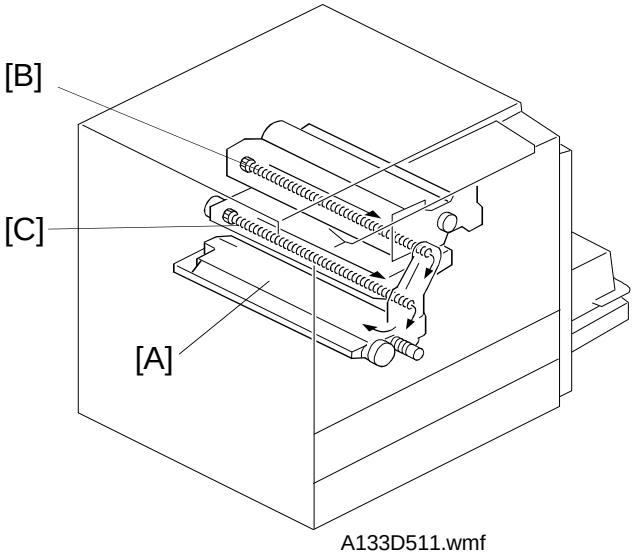


A133D509.wmf

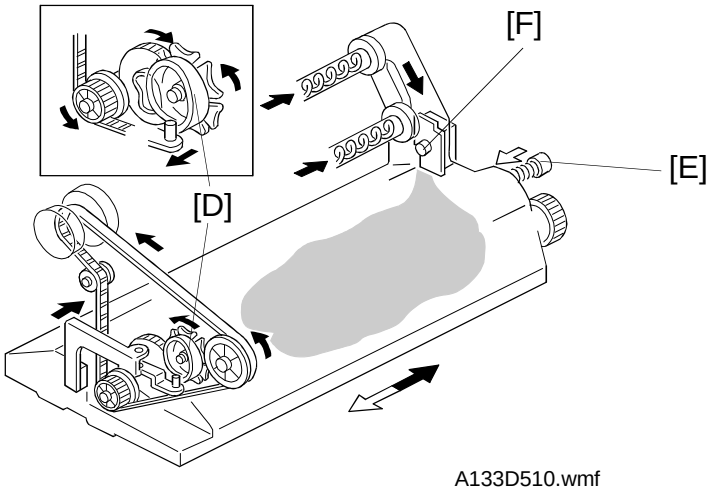
The spring [A] always pushes the cleaning blade [B] against the drum. The cleaning blade pressure can be manually released by pushing up the release lever [C]. To prevent cleaning blade deformation during transportation, the release lever should be locked in the pressure release (upper) position with the retainer pins that were removed during installation.

The pin [D] at the rear end of the cleaning blade holder touches the inner rim of the sinusoidal cam gear [E] which gives a side-to-side movement to the blade. This movement helps to disperse accumulated toner to prevent early blade edge deterioration at any particular location.

3.5.4 TONER COLLECTION MECHANISM



A133D511.wmf



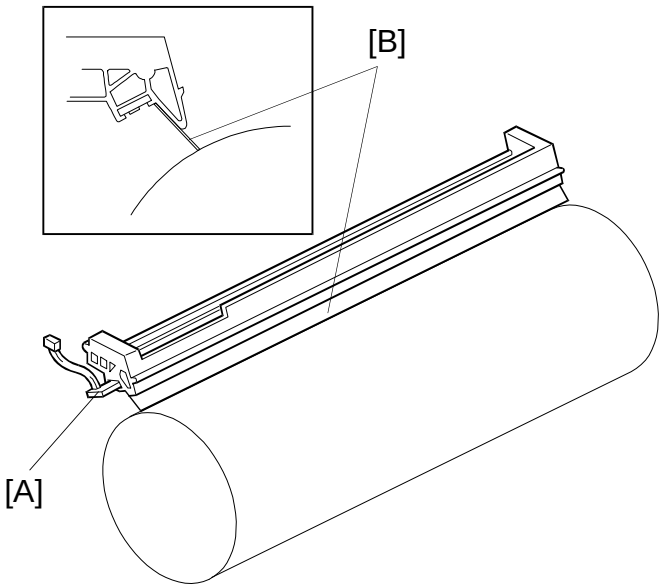
A133D510.wmf

The toner collected in the drum cleaning unit is carried into the toner collection bottle [A] by the drum toner collection coil [B]. The toner collected in the transfer belt unit is carried into the toner collection bottle by the transfer belt collection coil [C].

The toner collection bottle is pressed against the cam gear [D] by a spring [E] on the front side. The drive from the main motor drives the cam gear and shakes the toner collection bottle from front to rear to make the level of the collected toner even.

The toner overflow sensor [F] detects when the toner collection bottle is full. After the toner overflow sensor is activated, 250 copies are allowed, then copying is prohibited and a call service message appears on the LCD.

3.6 QUENCHING



A133D503.wmf

In preparation for the next copy cycle, light from the quenching lamp [A] neutralizes any charge remaining on the drum.

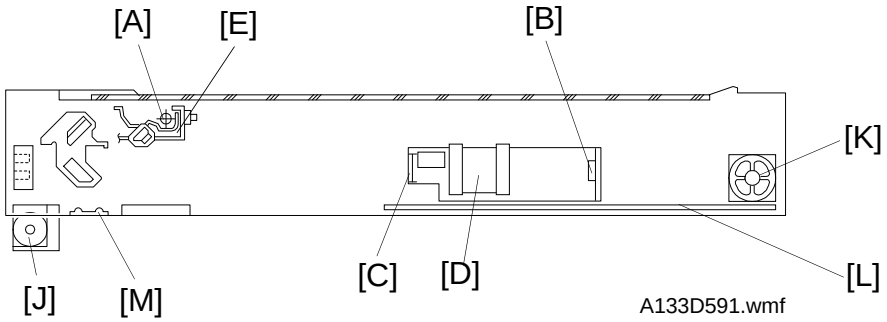
The quenching lamp turns on at the same time as the main motor activates.

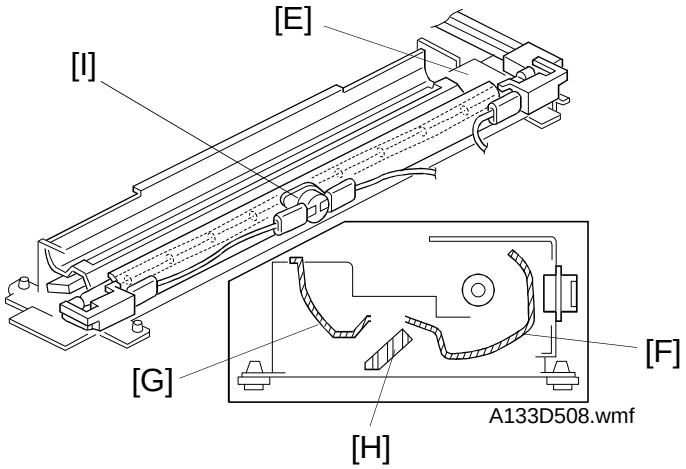
Red LEDs are used for the quenching lamp to reduce ultra-violet light that would cause light fatigue on the drum.

The mylar [B] on the side of the quenching lamp stops the flow of air from the cleaning unit to the charge corona unit, to prevent the charge corona unit from becoming dirty with toner.

4. SCANNING

4.1 OVERVIEW





An image of the original illuminated by the exposure lamp (a halogen lamp in this model) [A] is reflected onto a CCD (charge coupled device) [B] via the 1st, 2nd, 3rd mirrors, green filter [C], and lens [D].

The 1st scanner [E] consists of the exposure lamp, main and sub reflectors [F, G], and 1st mirror [H].

This model uses a halogen lamp for the exposure lamp, unlike the former black/white digital copiers which use fluorescent lamps. This is because a fairly fast cpm machine such as this one requires a greater light intensity than slower models. The exposure lamp is energized by a dc supply to avoid uneven light intensity as the 1st scanner moves in the sub scan direction. The entire exposure lamp surface is frosted to ensure even exposure in the main scan direction.

The green filter improves the reproduction of red areas in the original.

The light reflected by the main and sub reflectors is almost of equal intensity, to reduce shadows on pasted originals.

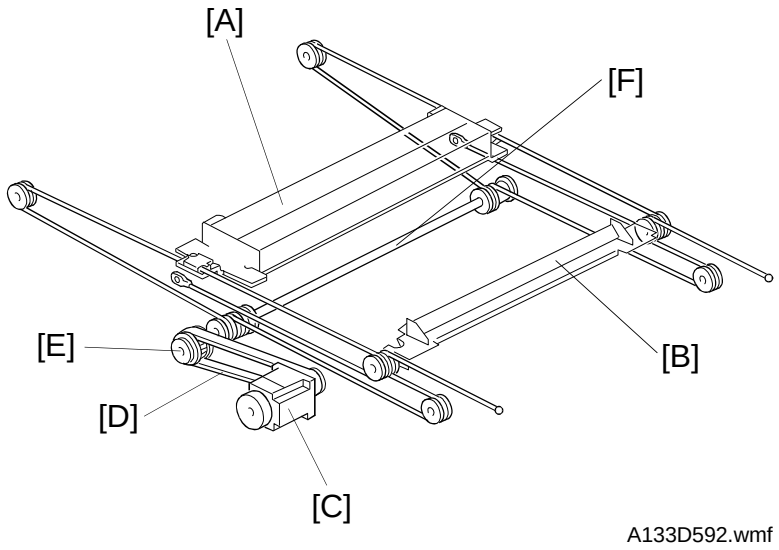
The thermoswitch [I] in the 1st scanner prevents overheating. It will turn off the exposure lamp at around 140°C.

The optics fan motor [J] is located under the home position of the scanner unit. It blows air into the optics cavity to prevent the exposure lamp and optics cavity from overheating during copying. The hot air exits through the vents in the upper cover.

The IPU fan motor [K] is located at the right side of the optics cavity under the lens housing cover. This fan blows air directly on the EX-IPU board [L] to prevent overheating.

An optics anticondensation heater [M] is available as optional equipment, which can be installed on the left side of the optical base plate. It turns on when the main switch is off.

4.2 SCANNER DRIVE



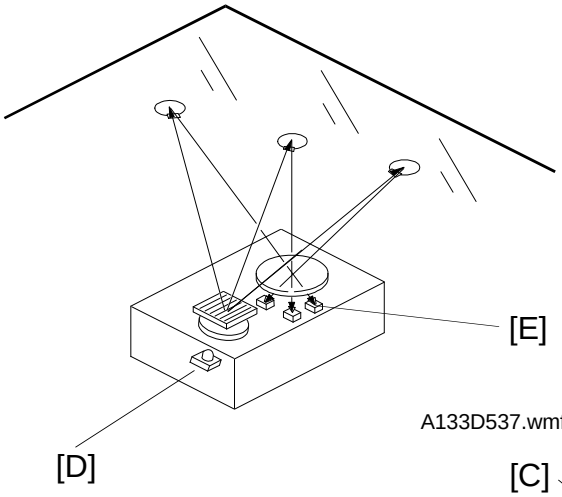
A five-phase stepper motor is used to drive the scanner. The 1st and 2nd scanners [A,B] are driven by this scanner drive motor [C] through the timing belt [D], scanner drive pulley [E], scanner drive shaft [F], and two scanner wires.

In full size mode, the 1st scanner speed is 200 mm/s during scanning. The 2nd scanner speed is half that of the 1st scanner.

In reduction or enlargement mode, the scanning speed depends on the magnification ratio (M: 0.25 to 4.00) as follows: 200/M mm/s. The returning speed is always the same, whether in full size or magnification mode. The image length change in the sub scan direction is done by changing the scanner speed and in the main scan direction it is done by image processing on the EX-IPU board.

The scanner drive board controls and operates the scanner motor. Magnification in the sub-scan direction can be adjusted by changing the scanner drive motor speed using SP4008.

4.3 ORIGINAL SIZE DETECTION IN PLATEN MODE



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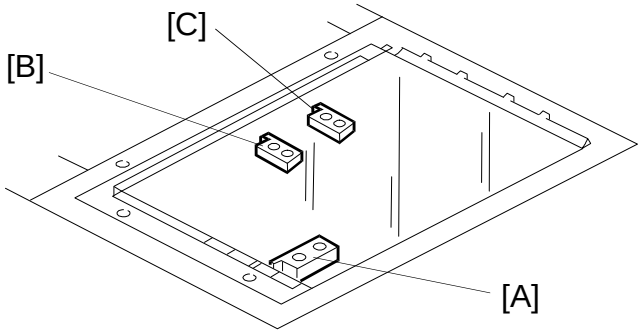
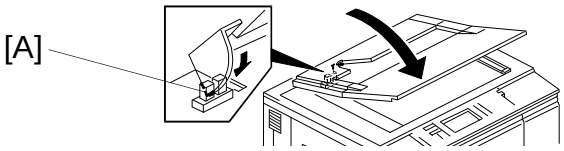


A133D539.wmf

There are three reflective sensors in the optics cavity for original size detection. The Original Width Sensor [A] detects the original width, and the Original Length Sensor-1 [B] and Original Length Sensor-2 [C] detect the original length. These are the APS (Auto Paper Select) sensors.

Inside each APS sensor, there is an LED [D] and either three photoelectric devices [E] (for the width sensor) or one photoelectric device (for each length sensor). In the width sensor, the light generated by the LED is broken up into three beams and each beam scans a different point of the exposure glass (in each length sensor, there is only one beam). If the original or platen cover is present over the scanning point, the beam is reflected and each reflected beam exposes a photoelectric device and activates it.

While the main switch is on, these sensors are active and the original size data is always sent to the main CPU. However, the main CPU checks the data only when the platen cover is opened.



A133D536.wmf

Original Size		Length Sensor		Width Sensor		
A4/A3 version	**LT/DLT version**	1	2	3	4	5
A3	11" x 17"	O	O	O	O	O
B4	10" x 14"	O	O	O	O	X
F4	8 1/2" x 14" (8" x 13")	O	O	O	X	X
A4–L	8 1/2" x 11"	X	O	O	X	X
B5–L	—	X	O	X	X	X
A5–L	5 1/2" x 8 1/2"	X	X	X	X	X
A4–S	11" x 8 1/2"	X	X	O	O	O
B5–S	—	X	X	O	O	X
A5–S	8 1/2" x 5 1/2"	X	X	O	X	X

Note: –L= Lengthwise, –S = Sideways, O = High (Paper Present), X = Low

The original size data is taken by the main CPU when the platen cover sensor [A] is activated. This is when the platen is positioned about 15 cm above the exposure glass. At this time, only the sensor(s) located underneath the original receive the reflected light and switch on. The other sensor(s) are off. The main CPU can recognize the original size from the on/off signals from the five sensors.

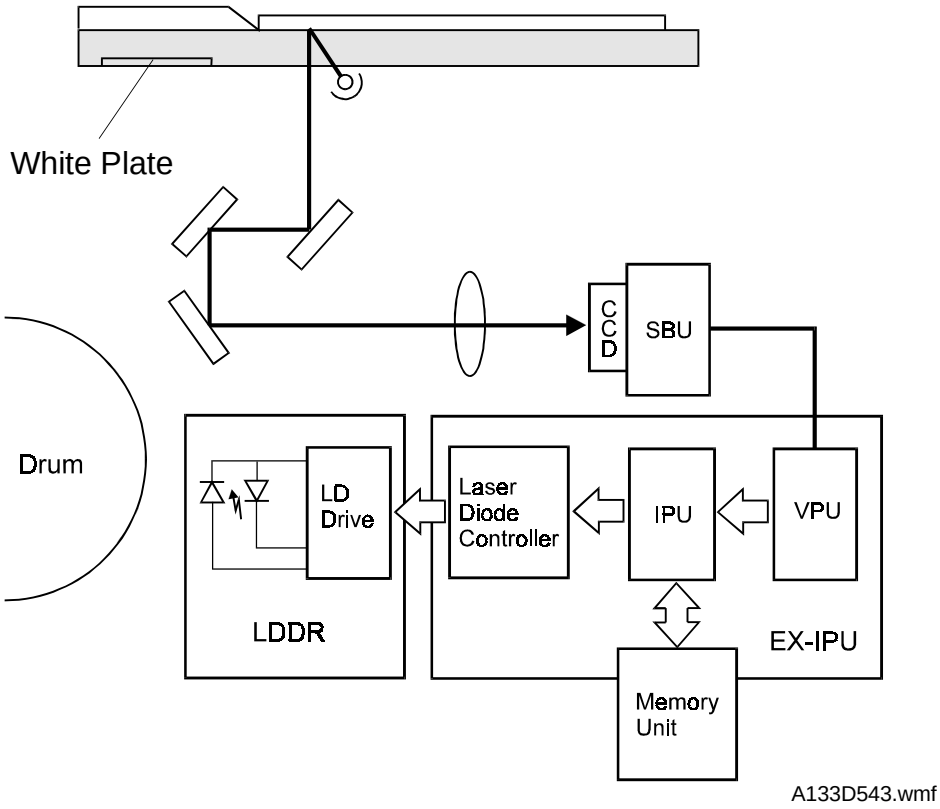
If the copy is made with the platen open, the main CPU decides the original size from the sensor outputs when the Start key is pressed.

The above table shows the outputs of the sensors for each original size. This original size detection method eliminates the necessity for a pre-scan and increases the machine's productivity. However, if the by-pass feeder is used, note that the machine assumes that the copy paper is lengthwise. For example, if A4 sideways paper is placed on the by-pass tray, the machine thinks it is A3 paper and scans the full A3 area, disregarding the original size sensors. This can cause excess toner to be transferred to the belt, so users should be instructed to always set the paper lengthwise on the by-pass tray.

Original size detection using the ARDF is described in the manual for the ARDF.

5. IMAGE PROCESSING

5.1 OVERVIEW



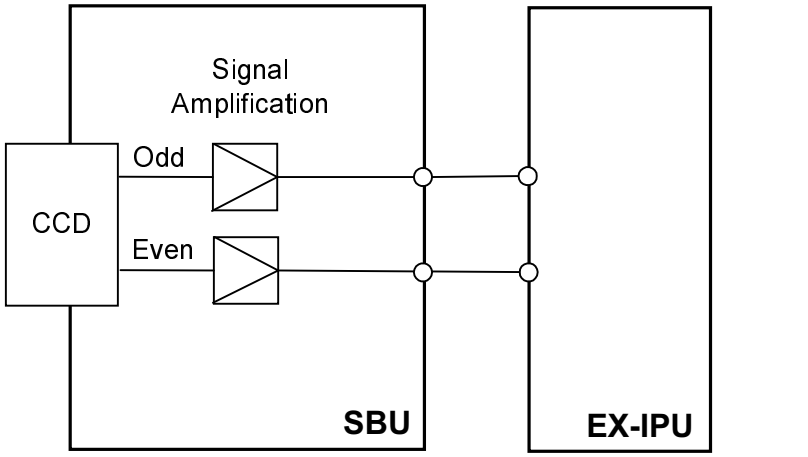
The CCD generates an analog video signal. The SBU (Sensor Board Unit) then sends the analog video signal to the EX-IPU (Extended Image Processing Unit) board.

The EX-IPU board can be divided into three image processing blocks: VPU, IPU, and laser diode controller.

- VPU: A/D conversion, signal composition, and auto shading.
- IPU: γ correction, auto text/photo separation, filtering, magnification adjustment, image creation, and dither processing.
- LD controller: Printer γ correction and the LD print timing control.

Finally, the EX-IPU board sends 8-bit video data to the LD drive board at the correct time.

5.2 SBU (Sensor Board Unit)



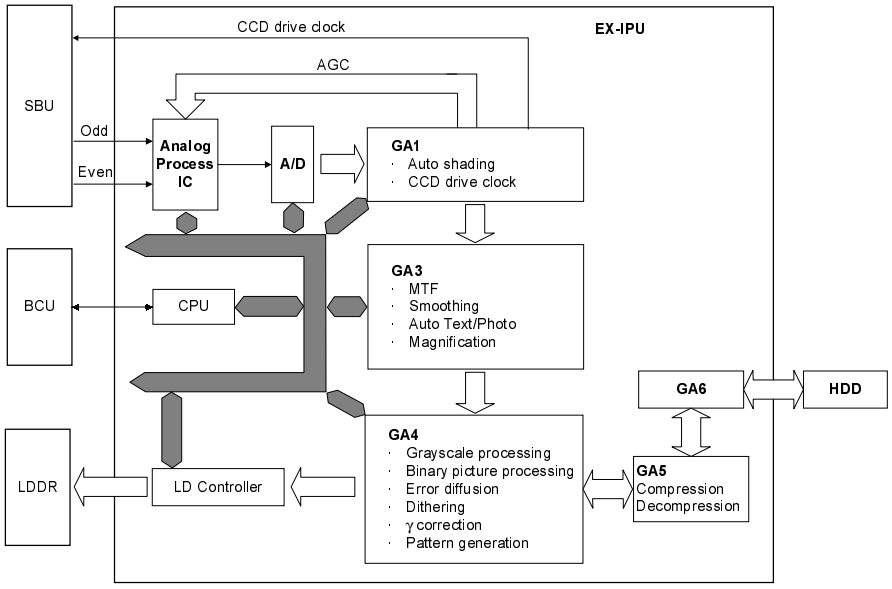
A133D544.wmf

The CCD converts the light reflected from the original into an analog signal. The CCD line has 5,000 pixels and the resolution is 400 dpi (15.7 lines/mm).

The CCD has two output lines, for odd and even pixels, to the EX-IPU board. Since the processing speed for one pixel is very fast, odd and even pixels are read from the CCD separately so that the signals can be amplified properly.

5.3 EX-IPU (Extended Image Processing Unit)

5.3.1 Overview



A133D545.wmf

The EX-IPU uses seven LSIs and a hard disk to process the video data. These LSIs have the following functions.

1. **Analog Process IC**
   Signal amplification and signal composition.

2. **A/D Converter**
   Converts analog video signals to 8-bit digital video signals.

3. **GA1 (Gate Array 1)**
   Generates the CCD drive clock and does auto shading

4. **GA3 (Gate Array 3)**
   MTF, smoothing, auto text/photo separation, and magnification

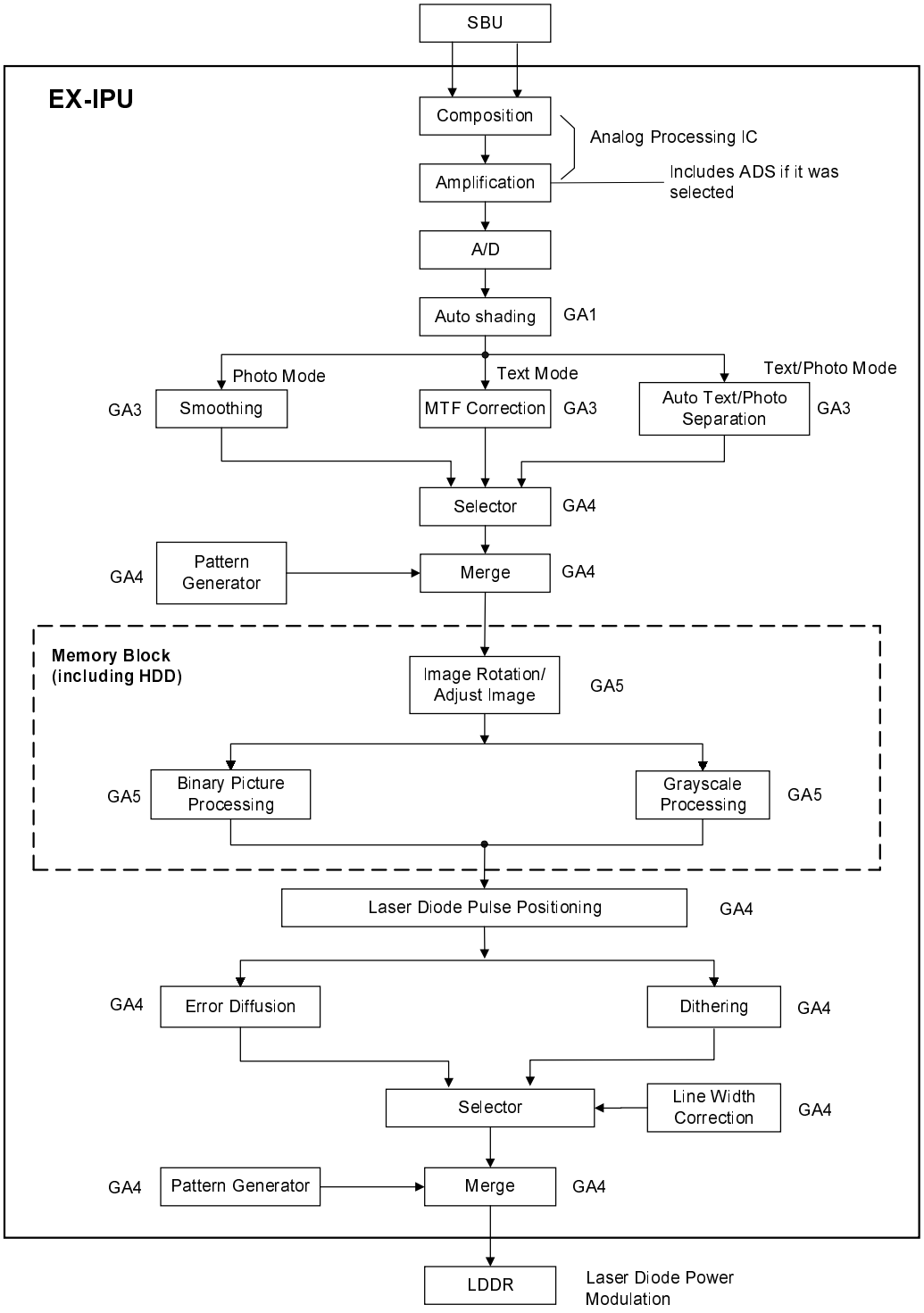
5. **GA4 (Also called the GASHITE IC)**
   Grayscale processing, binary picture processing, error diffusion, dithering, γ correction, and pattern generation.

6. **GA5 (Also called the GAFBTC IC)**
   Image data compression and decompression.

7. **GA6 (Also called the GAABS IC)**
   Image data interface between GA4 and HDD.

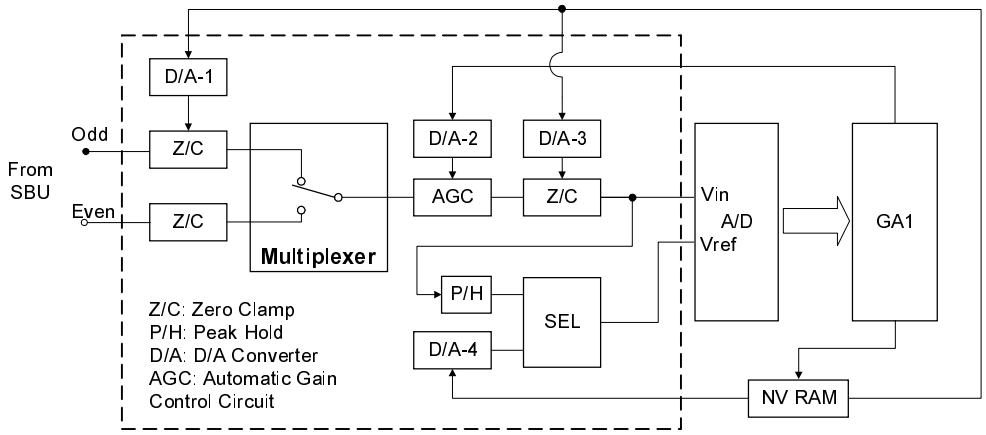
8. **Hard Disk Drive**
   Stores the compressed image data. Also holds user stamp data.

5.3.2 Image Processing Path



A133D546.wmf

5.3.3 Analog Processing



A133D547.wmf

1) Signal Composition

Analog signals for odd and even pixels from the SBU board are merged by a switching device.

2) Signal Amplification

The analog signal is amplified by operational amplifiers in the AGC circuit. The maximum gains of the operational amplifiers are controlled by the CPU on the EX-IPU board by monitoring the feedback signals (Auto Gain Control signal) from GA1.

3) A/D Conversion

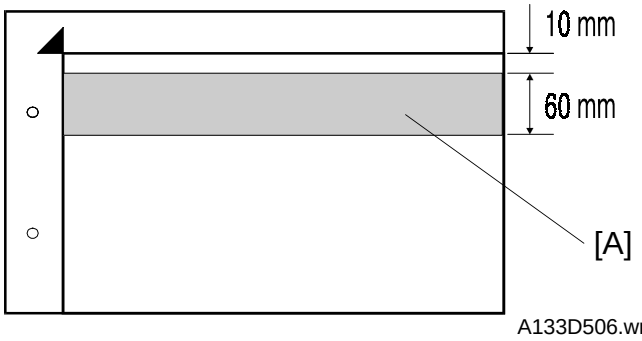
The amplified analog signals are converted to 8-bit digital signals. This will give a value for each pixel on a scale of 256 grades.

4) Feedback - D/A Conversion

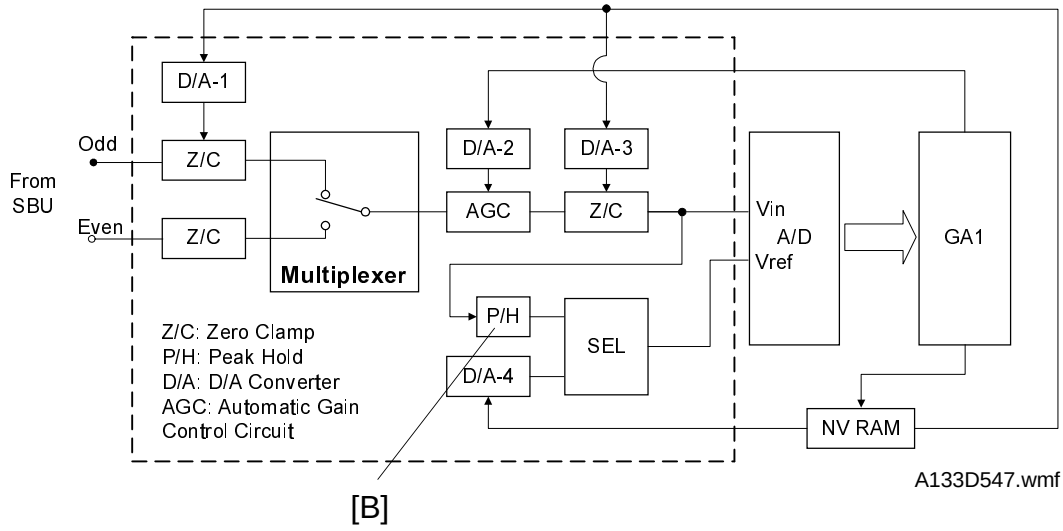
The CPU monitors the feedback signals from the shading circuit in the GA1 and the NV RAM, then calculates correction factors. These digital values are converted to analog signals and fed back to each circuit.

- D/A1: Adjusts the black level references for even pixels to match the even pixels.
- D/A2: Adjusts the gain curve of the amplifier.
- D/A3: Adjusts the absolute value of the black level.
- D/A4: Adjusts the reference value of the white level when scanning the white plate.

5.3.4 Auto Image Density (ADS)



A133D506.wmf



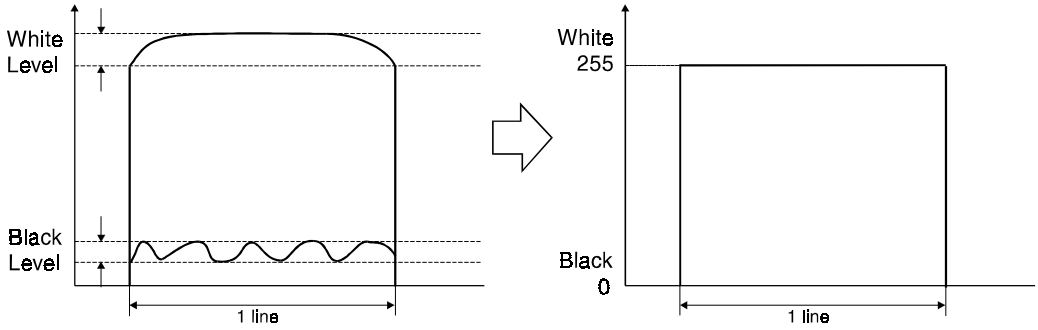
A133D547.wmf

This mode prevents the background of an original from appearing on copies.

The copier scans the auto image density detection area [A] as shown in the diagram. The CPU detects the peak white level every scan line in the area using the P/H (Peak Hold) circuit [B]. Then the peak white data is sent to the A/D converter to be the reference value. The video signal is converted to digital data using the peak white data. So, for example, when an original with a gray background is scanned, the density of the gray area is the peak white level density. So, the original background does not appear on copies.

Unlike with analog copiers, the user can select a manual image density when selecting auto image density mode, and the machine will use both settings when processing the original. This is useful when making copies of an original that has light image density with background; ADS removes the background, and if the user selected a dark manual image density setting, the image will be brought out more clearly in the copy.

5.3.5 Auto Shading



A133D548.wmf

There are two auto shading methods. One is black level correction and the the other is white level correction.

1) Black Level Correction

The CPU reads the black dummy data from one end of the CCD signal (about 64 pixels) and takes the average of the black dummy data. Then, the CPU deletes the black level value from each image pixel. The black level correction is performed every main scan line during scanning.

2) White Level Correction

Before scanning the original, the machine reads a reference waveform from the white plate (below the left scale; see the diagram accompanying section 5-1: Overview). The average of the white video level for each pixel is stored as the white shading data in the FIFO memory in the GA1 chip. This white level correction is performed every scan.

The video signal information for each pixel obtained during image scanning is corrected by GA1 as follows.

$$\text{Output} = \frac{(\text{Video data}) - (\text{Black shading data})}{(\text{White shading data}) - (\text{Black shading data})} \times 255$$

5.3.6 Original Modes

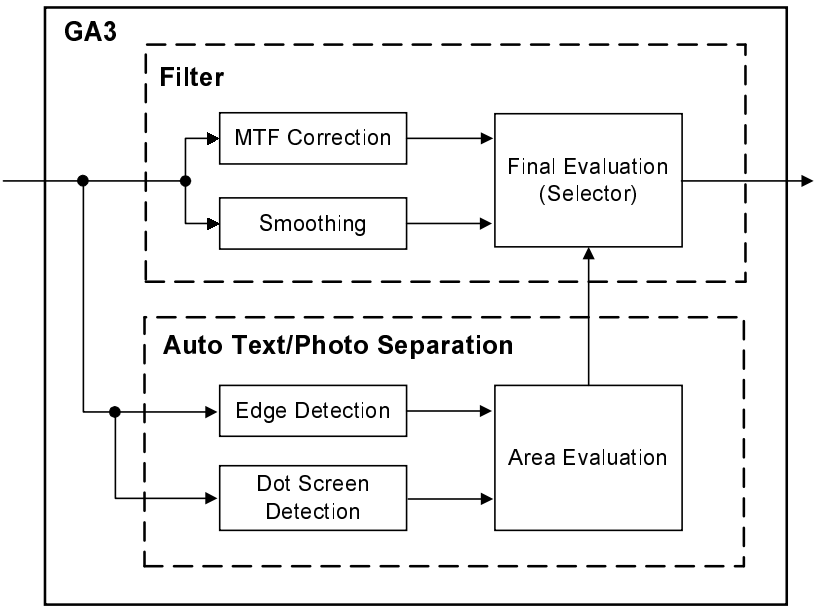
The user can select one of four original modes. These are:

- Letter: For originals that consist of line drawings and text
- Photo: For originals that consist of grayscale images such as photographs
- Letter/Photo: For originals that consist of both of the above
- Generation: When making a copy of a copy

The machine uses various filtering and processing techniques to enhance the data to suit the selected mode. These will be explained in the following sections:

- Filtering and Text/Photo Separation
- Gradation Processing
- Line Width Correction
- Summary of Image Processing Methods

5.3.7 Filtering and Text/Photo Separation



A133D549.wmf

1. Filtering

There are two software filters for enhancing the desired image qualities of the selected original mode: the MTF filter and the smoothing filter.

The MTF filter emphasizes sharpness and is used in Letter and Generation modes. The smoothing filter is used in Photo and Letter/Photo mode. (In Photo mode, this can be changed to MTF using SP 4904-3.)

The filter strengths for these modes can be adjusted with SP 4903-1.

2. Auto Text/Photo Separation

This is used only in Letter/Photo mode. In Letter/Photo mode, the original image is separated into text and photo areas (dot screen areas).

Generally, text areas have strong contrast between the image and the background. In photo areas (dot screen areas), mid-range gray areas are common. By using these characteristics and the following separation methods, the original image is separated into text and photo areas for area evaluation.

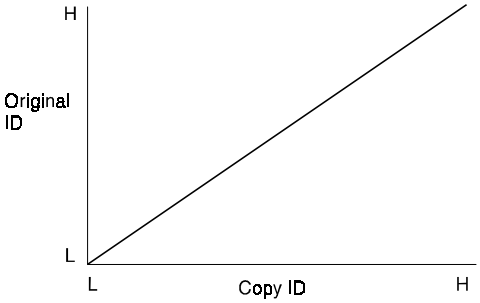
1. Edge detection
   The 8-bit digitized image data is filtered and converted into single-bit data. The edges of text areas are detected using a 3 x 3 matrix filter.

2. Photo area (dot screen) detection
   The image data is converted into single-bit data using the other MTF filter in the photo area detection block. Then it is compared with a 5 x 5 matrix table. The result of this filtering determines where the CPU detects photo areas.

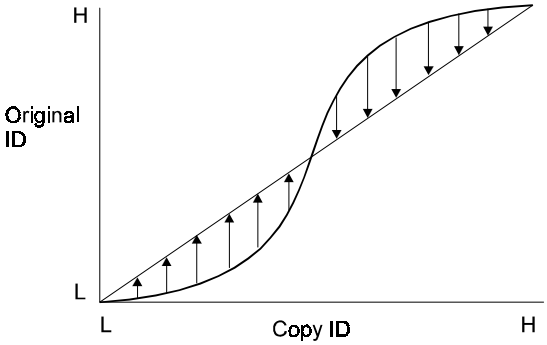
3. Area evaluation
   This circuit determines which areas of the original are text areas and which are photo areas.

4. Final evaluation
   This circuit receives inputs for each pixel from the MTF (text) and smoothing (photo) circuits and selects data from one of these inputs depending on the result of the area evaluation for that pixel.

5.3.8 Gamma (γ) Correction



A133D551.wmf

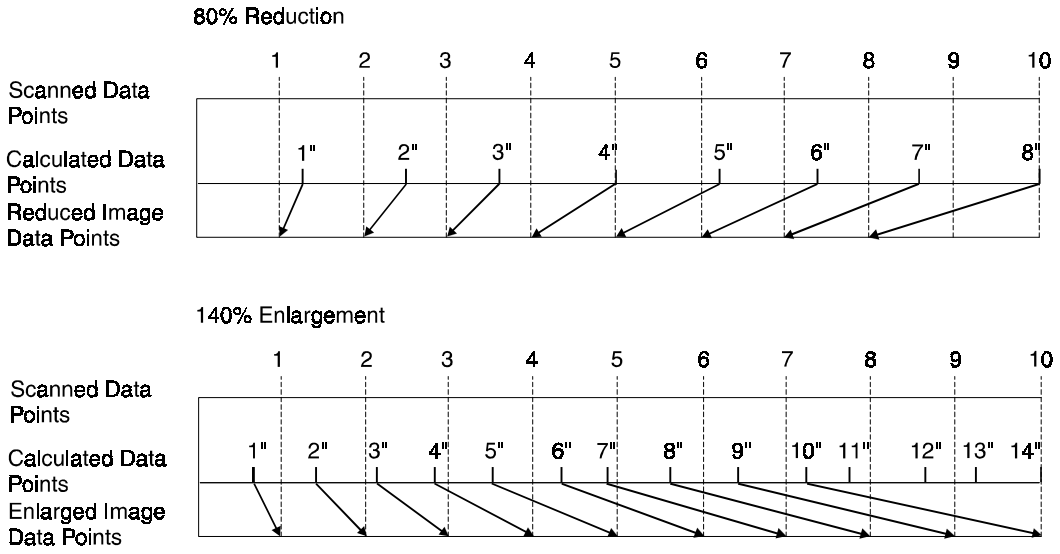


A133D552.wmf

This corrects the response of the CCD and the characteristics of the printer (i.e., the characteristics of the drum, laser diode, and lenses) to the various shades in the gray scale from black to white. The relationship between original ID and copy ID should be constant as shown in the diagram on the left. However, in reality, it is more like that shown in the diagram on the right. Gamma correction corrects the data for this deviation.

In this model, the data for the gamma correction is fixed and stored in the memory. The image data is corrected in accordance with the gamma data.

5.3.9 Main Scan Magnification


80% Reduction
1 2 3 4 5 6 7 8 9 10
Scanned Data Points
Calculated Data Points
Reduced Image Data Points
1" 2" 3" 4" 5" 6" 7" 8"
140% Enlargement
1 2 3 4 5 6 7 8 9 10
Scanned Data Points
Calculated Data Points
Enlarged Image Data Points
1" 2" 3" 4" 5" 6" 7" 8" 9" 10" 11" 12" 13" 14"

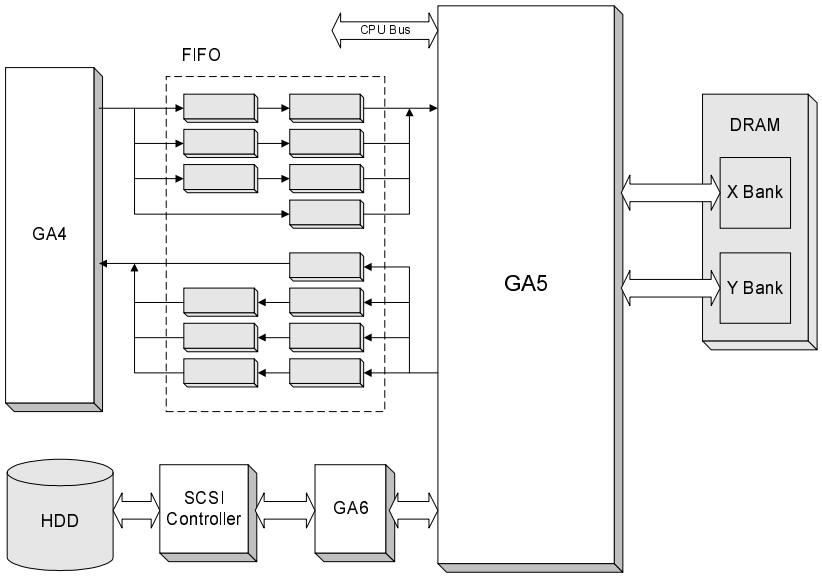
A133D550.wmf

Reduction and enlargement in the sub scan direction are done by changing the scanner speed. However, reduction and enlargement in the main scan direction are handled by the GA3 chip on the EX-IPU board.

Scanning and laser writing are done at a fixed pitch (the CCD elements cannot be squeezed or expanded). So, to reduce or enlarge an image, imaginary points are calculated that would correspond to a physical enlargement or reduction of the image. The correct image density is then calculated for each of the imaginary points based on the image data of the nearest four true points. The calculated image data then becomes the new (reduced or enlarged) image data.

Main scan magnification can be disabled with SP 4903-5 to test the GA3 IC.

5.3.10 Memory Block



A133D596.wmf

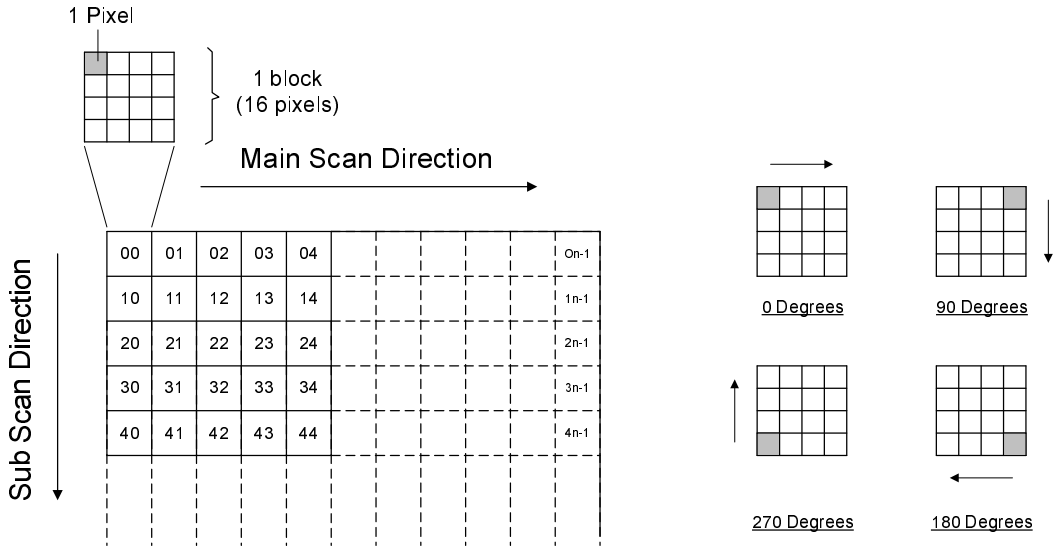
The memory block consists of the GA5 and GA6 ICs, the SCSI controller, and the hard disk drive. The functions of each device are as follows.

GA5:	Compressing the 8-bit image data Image rotation Image data transfer to the FIFO memory, DRAM, and the GA6
GA6:	Image data handling to/from the hard disk drive
FIFO memory:	Line buffer memory for image compression (5k x 8 bits total 14 pcs)
DRAM:	Page memory for image compression (12MB). This can store enough data for an A3 size page.
Hard Disk Drive	Stores the compressed image data (1 GB).

All scanned data goes through this memory block. This memory block functions like a page memory, in which the scanned image data is held before printing. As a result, many copies can be made with one scan, and various functions can be performed on the stored image data, including the following.

- Rotate Image
- Combine Mode
- Image Repeat
- Overlay/Merge
- Sort, Rotate Sort, and Stack

5.3.11 Image Compression and Decompression



– Image Data Memory Mapping – – Image Rotation –

A133D597.wmf

FIFO Memory

The image data from the GA4 IC first goes to the FIFO block. This block consists of total 14 FIFO memories (7 for the input data, the others for the output data) because the image compression is done using four scan lines at the same time to improve the image compression speed.

GA5

The image data then goes to the GA5 IC, where the image data for a whole page is divided into many blocks (the block size is 4 x 4 pixels) as shown above left. Then, each block is compressed (the compression ratio is 2/3) and sent to GA6 through the DRAM.

For printing, the compressed data block from the GA6 IC goes back to the GA5 IC through the DRAM. This IC assigns these blocks to the proper positions for printing, then the data blocks are decompressed.

In the image rotation mode, each compressed data block from the GA6 IC is rotated into the correct orientation and mapped into the proper position, then the blocks are decompressed.

When grayscale processing mode is selected (this is the default), the input and output image data are handled as 8-bit signals. When binary picture processing mode is selected (using SP4904-4), the input signal is handled as an 8-bit signal but the output signal is handled as a single-bit signal.

5.3.12 Gradation Processing

Gradation processing is done after the data is retrieved from the hard disk. There are two types of gradation processing:

- Grayscale processing: this has 256 output levels for each pixel, and is used to get the best reproduction of grayscales
- Binary picture processing: this has only two output levels (black and white)

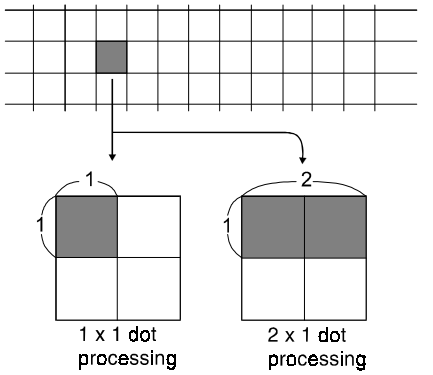
The default gradation processing mode is grayscale processing. This default can be changed using SP4904-4.

In some original modes, the gradation processing method in use can be enhanced with a matrix processing technique (error diffusion or dithering).

For a summary of the types of processing selected by the machine for each original mode, see section 5.3.14 "Summary of Image Processing Methods".

1. Grayscale Processing

- 1 x 1 and 2 x 1 dot processing -



Grayscale processing

A133D553.wmf

Each pixel has a video signal level between 0 and 255.

In this model, there two types of grayscale processing: 1 x 1 dot processing and 2 x 1 dot processing.

1 x 1 dot processing just takes the video signal level for each pixel as it comes.

In 2 x 1 dot processing, the levels of two adjacent dots are averaged, and the video signal levels for both pixels are changed to this average value.

Using the 1 x 1 dot mode, the image will be became more sharp in focus than using 2 x 1 dot mode.

The default modes for each original mode are as follows:

Letter Mode, Generation Mode: 1 x 1

Photo Mode: 1 x 1 with a 6 x 6 dither matrix (the dither matrix type can be changed with SP mode 4904-2)

Letter/Photo Mode:

- Text areas: 1 x 1 (this can be changed with SP mode 4904-7)
- Photo areas: 2 x 1 with error diffusion (this can be changed with SP mode 4904-8)

- Pulse Width Modulation -

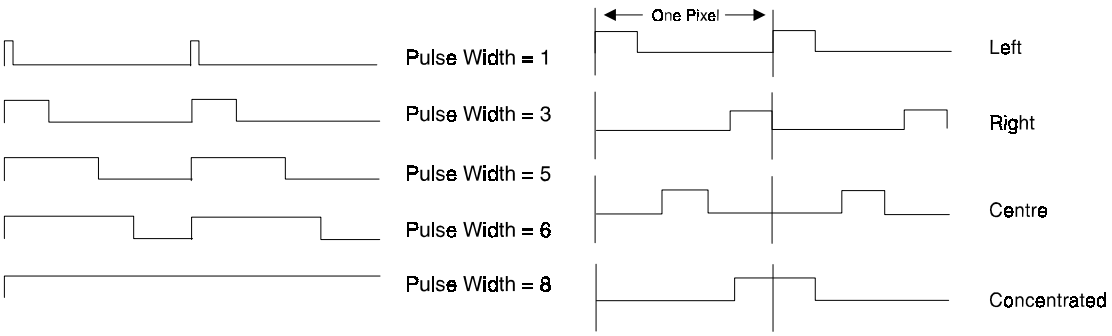
This machine uses a form of pulse width modulation to generate the grayscales and photo area reproduction effects.

In this machine, pulse width modulation consists of the following processes:

- Laser diode pulse positioning
- Laser diode power modulation

Laser diode power modulation is done by the laser diode drive board (LDDR), and will be explained in the Laser Exposure section. Briefly, the width of the laser pulse for a pixel will depend on the output level (from 0 to 255) required for the pixel.

This section of the manual explains how laser diode pulse positioning is done.



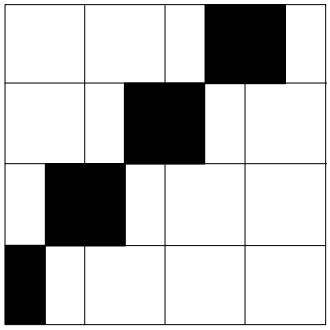
A133D588.wmf

a133d589.wmf

The width of the laser pulse for each pixel has 8 settings (see the diagram on the left at the bottom of the previous page).

For each pixel, the location of the active (laser on) part can be either at the left side of the laser drive signal for the pixel, at the center, or at the right side. The diagram on the right (at the bottom of the previous page) shows this for two adjacent pixels with equal laser signal pulse widths.

There is also a mode known as "concentrated", in which the left hand pixel of an adjacent pair is printed with the active part on the right, and the right hand pixel has the active part on the left. The effects of this mode are shown below.



A133D590.wmf

In 1 x 1 dot processing, the machine determines which type of pulse positioning to use for adjacent pixels; the position of the active part of the laser signal depends on the values of the adjacent pixels. In the example shown above, the machine is printing a thin diagonal line. For the pixels in this thin line, "concentrated" mode is used; the active part for the pixel on the left is moved over to the right. Otherwise, the machine would print two thin diagonal lines on the paper.

In 2 x 1 dot mode, the center mode is used. In this mode, the dots are always a small distance apart, which leads to a better grayscale effect.

Pulse positioning can be switched on or off with SP4904-1.

- If pulse positioning is disabled, the active part of the laser signal is always at the center of the pixel.
- If pulse pulse positioning is enabled, the type that is used (left, center, right, concentrated) is determined automatically for each adjacent pair of pixels (if 1 x 1 mode is used), or center mode (if 2 x 1 mode is used).

- Error Diffusion -

This can only be used in Letter/Photo mode.

The error diffusion process reduces the difference in contrast between light and dark areas of a halftone image. Each pixel is corrected using the difference between it and the surrounding pixels. The corrected pixels are then compared with a error diffusion matrix table. This matrix table cannot be selected.

1) Grayscale processing mode

In 1 x 1 dot processing mode, the output image signal level has 9 levels (from white to black).
In 2 x 1 dot processing mode, the output image signal level has 17 levels.

2) Binary processing mode

The output image signal level has just 2 levels (white/black).

- Dither Processing -

This can only be used in Photo mode.

In dither processing, each pixel is compared with a pixel in a dither matrix table, and in this machine, the result is an 8-bit value (from 0 to 255). There are four dither matrixes that can be selected from to optimize image quality. The matrix that is used depends on the setting of SP 4904-2.

- If 6 x 6 is selected (suitable for most documents), the processing mode that is used (binary picture or gradation) depends on the setting of SP 4904-4.
- If 6 x 6 (new) is selected, the processing mode that is used also depends on the setting of SP 4904-4. However, the gamma curve is different from the one used in the above 6 x 6 mode, to improve reproduction of faint originals.
- 8 x 8 can only be used if 4904-4 is set to "binary". Also, if 4904-4 is set to "binary", the matrix is always 8 x 8, regardless of the setting of SP4904-2.
- 4 x 4 leads to a sharper image.

2. Binary Picture Processing

Each video signal level is converted from 8-bit to 1-bit (black and white image data) in accordance with a threshold level. The threshold level can be adjusted with SP4904-12.

If binary picture processing is enabled, pulse positioning (left, center, right, concentrated) depends on the setting of SP2905.

In addition, note the following.

- Photo Mode: A dither matrix will be used. The matrix is always 8 x 8 regardless of the setting of SP 4904-2.
- Letter/Photo Mode: Error diffusion will be used.

5.3.13 Line Width Correction

This function is effective only in the generation copy mode.

Usually, when making a copy of an original which was made on a copier, the line will bulge in the main scan direction as a result of the negative/positive development system that is used in this model. So, pixels on edges between black and white areas are compared with adjacent pixels, and if the pixel is on a line, the line thickness will be reduced.

Also, in this model, lines can be thickened using a similar process to the above.

The line width correction type can be selected with SP4904-6.

5.3.14 Types of Image Processing

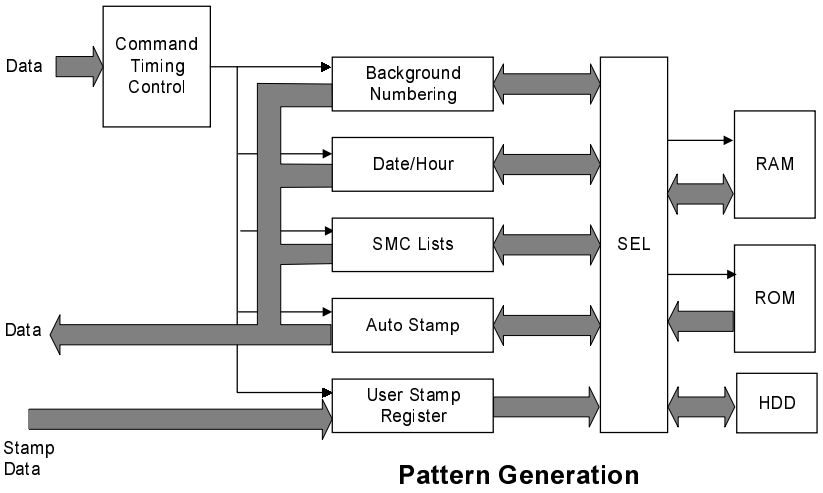
The following table shows which image processing is done for each selected mode. These are default settings; the table indicates which of these can be changed by SP mode.

Mode	Area Type	Filter Type (Filter Strengths: SP 4903-1)	Gradation Processing (See the Note below)	Line Width Correction	Image Processing Type
Letter/ Photo	Text Area	Smoothing	1 x 1dot (SP4904-7)	–	Grayscale Processing (SP4904-4)
	Photo Area		2 x 1dot, Error diffusion (SP4904-8)		
Photo		Smoothing (SP4904-3)	1 x 1 dot Dither (6 x 6 matrix) Matrix type: SP4904-2	–	
Letter		MTF	1 x 1 dot	–	
Generation		MTF	1 x 1 dot	Enabled (SP4904-6)	

NOTE: If SP4904 is set to Binary Picture Processing, the processes in the Gradation Processing column will be different. See the "Binary Picture Processing" section for details.

5.4 OTHERS

5.4.1 Pattern Printing



Pattern Generation

A133D555.wmf

The pattern generation circuit consists of the pattern generation circuit in the GA4 IC, RAM, ROM and Hard Disk. The pattern generation circuit has the following functions.

- Background Numbering
- Date and Hour
- SMC (Service and Machine Communication) lists
- Auto stamp
- User stamp
- Rotation of the stamp pattern

The selected function retrieves data from the RAM or ROM, then this data is merged with the image data.

The user stamp data is stored in the RAM and also in the hard disk drive for backup. This is because there is no battery back-up system for the RAM.

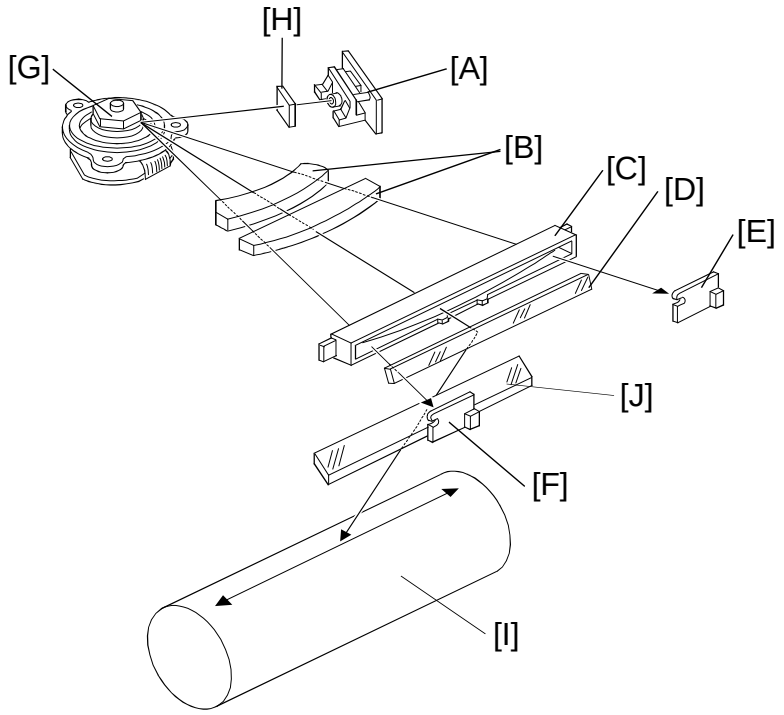
NOTE: Make sure that the user stamp data is stored again when the hard disk drive has been replaced.

5.4.2 Test Patterns

The GA3 and GA4 ICs have a test pattern generator and test pattern data. The gate array sends the test pattern data to the printer. These test patterns can be printed out using the SP modes. These test patterns help investigate defective EX-IPU boards and adjust the printing area (using the trim pattern).

6. LASER EXPOSURE

6.1 OVERVIEW



A133D613.wmf

A: Laser Diode Unit
B: F-theta Lenses
C: BTL (Barrel Toroidal Lens)
D: Drum Mirror
E: Laser Synchronization Detector Board-2
F: Laser Synchronization Detector Board-1
G: Polygon Mirror Motor
H: Cylindrical Lens
I: OPC Drum
J: Shield Glass

This machine uses a laser diode to produce electrostatic images on an OPC drum [I]. The laser diode unit converts image data from the EX-IPU board into laser pulses, and the optical components direct these pulses to the OPC drum.

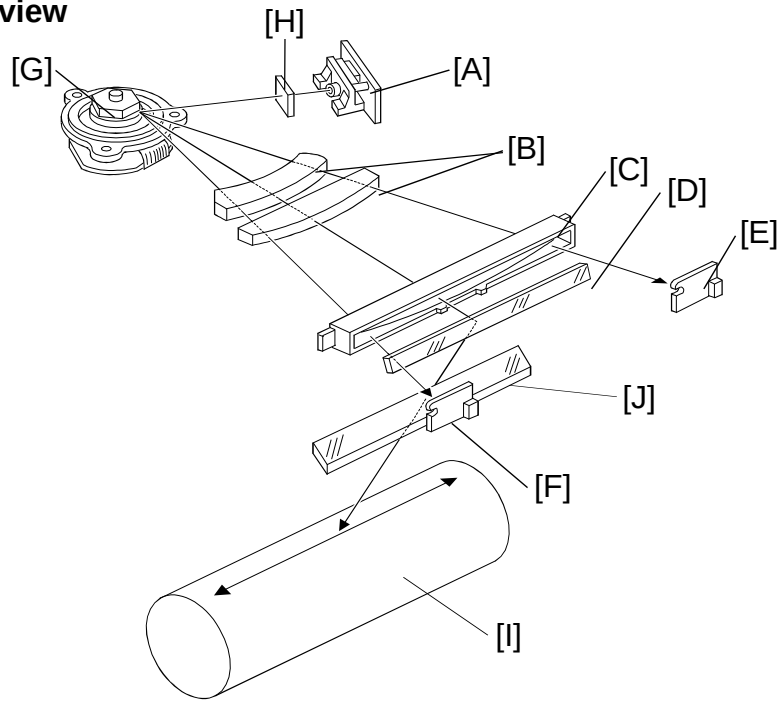
To produce a high quality copy image, there are 256 gradations for the laser pulses, controlled through power modulation and pulse width modulation.

Exposure of the drum by the laser beam creates the latent image. The laser beam makes the main scan while drum rotation controls the sub scan.

The strength of the beam is 1.3 mW on the drum surface at a wavelength of 780 nm.

6.2 OPTICAL PATH

6.2.1 Overview



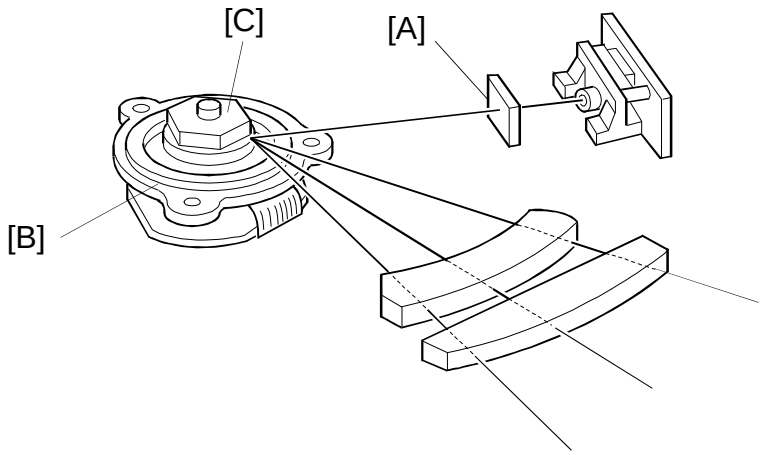
A133D613-2.wmf

The output path from the laser diode to the drum is shown above.

The LD unit [A] outputs the laser beam to the polygon mirror [G] through the cylindrical lens [H].

The polygon mirror reflects a full main scan line with a single surface of the mirror. The laser beam goes through the f-theta lens [B] and BTL [C]. The drum mirror [D] reflects the laser beam to the drum [I] through the toner shield glass [J].

The laser synchronizing detector boards [E, F] determine the main scan starting position, and detect variations in the time required to make a main scan.



A133D614.wmf

6.2.2 Cylindrical Lens

The laser beam is focused by the cylindrical lens [A], and sent to the polygon mirror.

6.2.3 Polygon Mirror

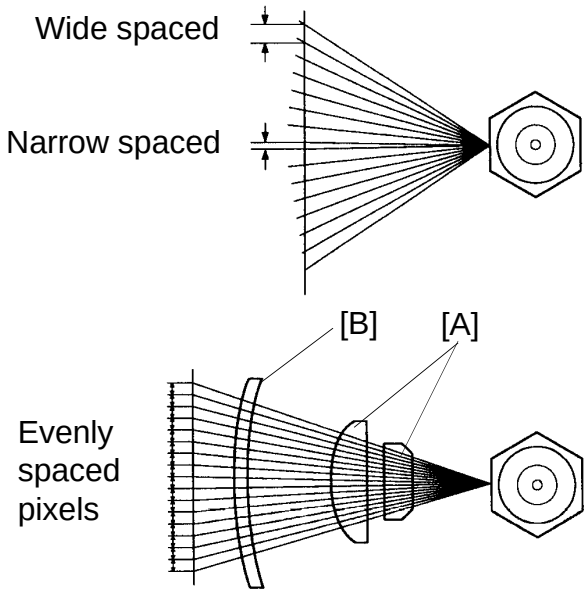
The polygon mirror assembly consists of the polygon motor [B] and the polygon mirror itself [C].

As the mirror rotates, it reflects the laser beam across the drum, via the f-theta lens, BTL, and drum mirror. One main scan line is made by the beam reflected from one face of the polygon mirror.

The mirror is precisely ground to enable high reflectivity and to prevent pixel misalignment on the drum in both the main scan and sub scan directions.

The polygon mirror motor rotates at 31,496 rpm. One rotation corresponds to six main scans.

6.2.4 F-theta Lenses and the BTL

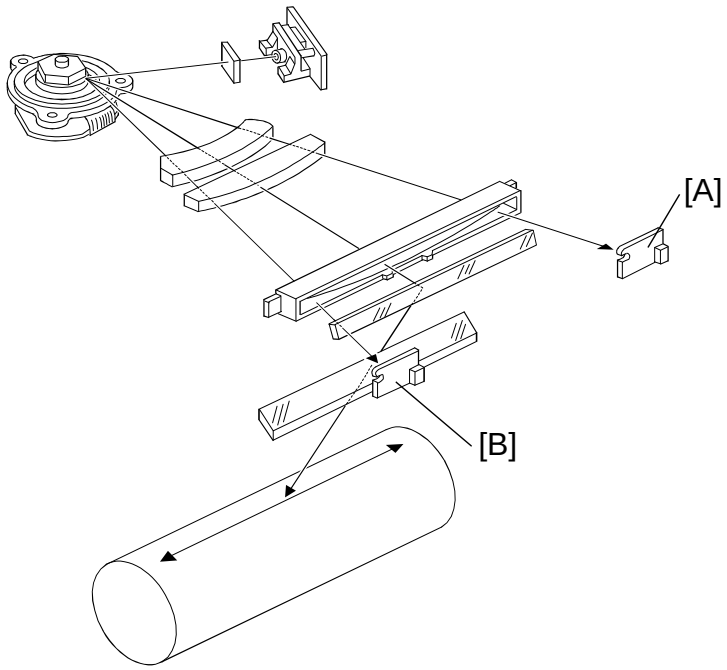


A133D615.img

The angles between pixels are equal. However, if the beam were to go directly to the drum as shown in the upper illustration, the spacing between pixels would differ with the angle of the beam. The pixels near the end of the drum would be further apart than those near the middle of the drum. The pixels would also be slightly thicker toward the ends of the drum than in the middle.

The f-theta lenses [A] and BTL [B] correct for this by deflecting the beam slightly inward to ensure uniform picture element spacing and diameter. The f-theta lenses and BTL also correct for irregularities in the polygon mirror face, focusing irregular beams onto the correct part of the drum.

6.2.5 Laser Synchronizing Detector Boards



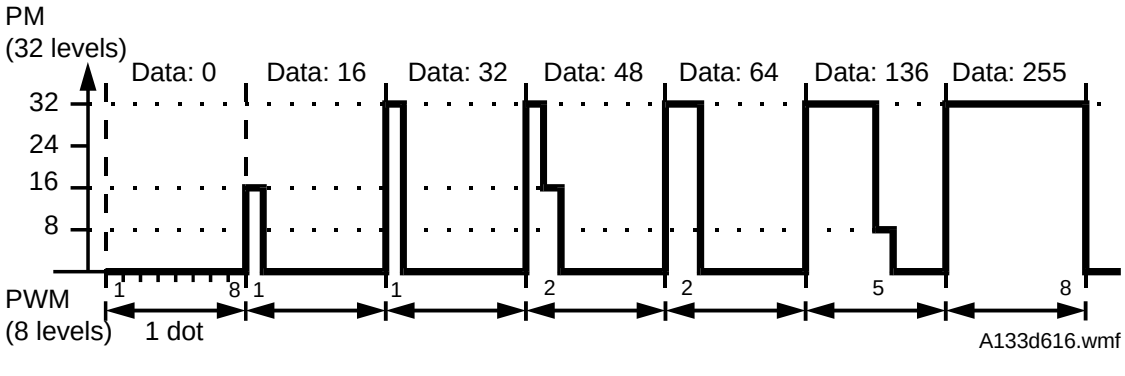
A133D613-3.wmf

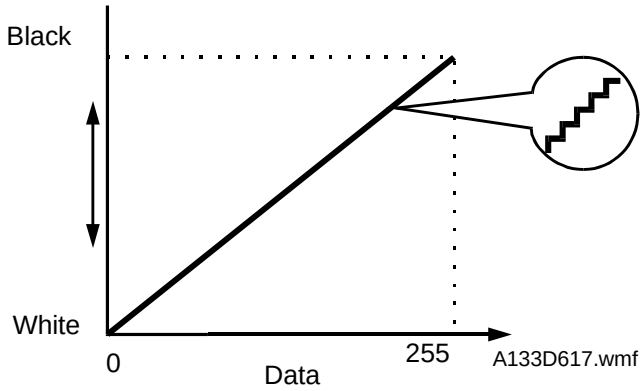
Some of the optical components are made of plastic, and may expand and contract with changes of temperature. If this happens, the number of pulses in the laser main scan across the drum will vary. To counteract the effects of this, the machine adjusts the frequency of the laser pulses to keep the number of laser pulses in each main scan constant.

To do this, the machine has two laser synchronizing detector boards. They are used to determine the number of clock pulses between the start and end of each main scan. (These clock pulses are from the base clock, which is at a much higher frequency than the laser frequency.)

The laser synchronizing detector board-1 [B] synchronizes the main scan start timing. At the other side, the laser synchronizing detector board-2 [A] counts the number of clock pulses since detector board-1 was activated; from this count and from the current laser frequency, the machine can calculate how many laser pulses there were across the main scan.

6.3 GRADATION CONTROL (LASER POWER MODULATION)





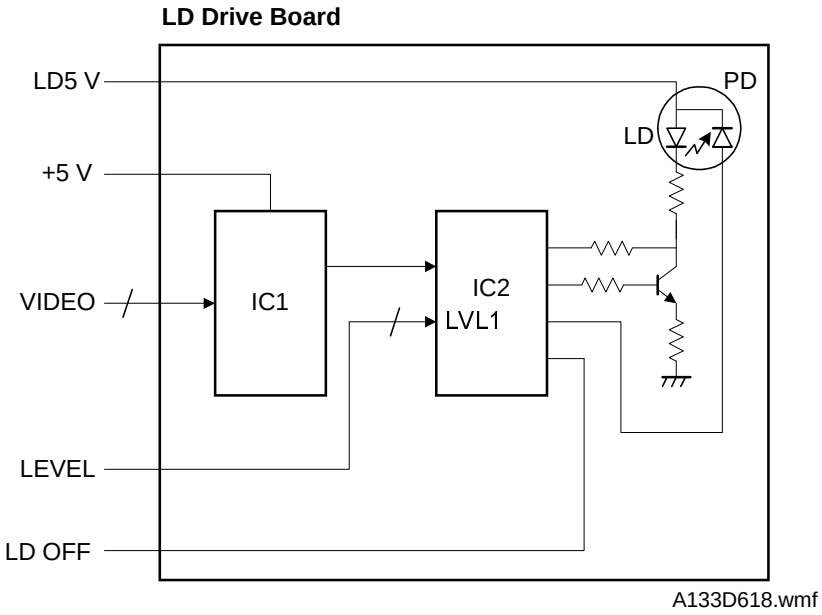
To make the latent image, the laser beam illuminates the image area of the drum surface. The longer the laser is on and the stronger its intensity is, the darker the developed pixel becomes. Modulating (changing) the width of the pulse makes the on time of the laser longer or shorter. There are eight pulse width levels in this model.

While the laser is on to make one dot, the intensity of the laser is controlled by power modulation (PM). The laser's intensity is controlled by the amount of current sent to the laser diode. Modulating the power makes the laser brighter or dimmer. There are 32 power levels, or laser intensity levels.

The machine uses the 8 pulse width levels and 32 power levels to create the 256 possible grayscale values for each pixel.

The power is modulated ONLY at the end of the active part of the on/off cycle of the laser pulse. For example (see the diagram above), to make a pixel with a grayscale value of 48, the laser pulse width level for that pixel will be 2. The first period of the pulse will be at the full power (32), and the second pulse will be at power 16 to make up the remainder of the 48 (32 + 16 = 48).

6.4 AUTO POWER CONTROL (APC)



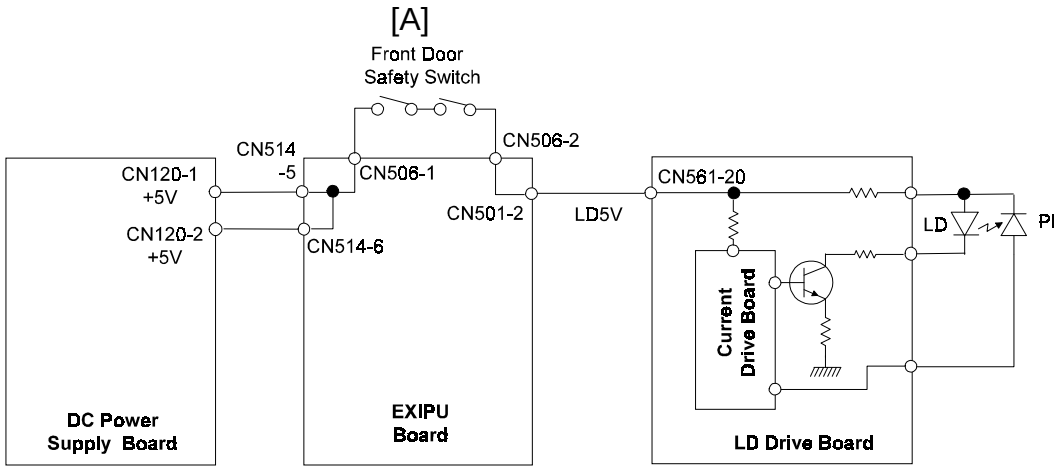
Even if a constant electric current is applied to the laser diode, the intensity of the output light changes with the temperature. The intensity of the output decreases as the temperature increases.

In order to keep the output level constant, the output light intensity is monitored through a photodiode (PD) enclosed in the laser diode. The photodiode passes an electrical current that is proportional to the light intensity. The output is not affected by temperature, so it faithfully reflects the changes in the LD output, without adding anything itself.

Just after the main switch is turned on, IC2 on the LD drive board excites the laser diode at full power (power level 32) and stores the output of the photodiode as a reference in IC2. IC2 monitors the current passing through the photodiode. Then it increases or decreases the current to the laser diode as necessary, comparing it with the reference level. Such auto power control is done during printing while the laser diode is active.

The laser power level is adjusted on the production line. Do not touch the variable resistors on the LD unit in the field.

6.5 LD SAFETY SWITCHES



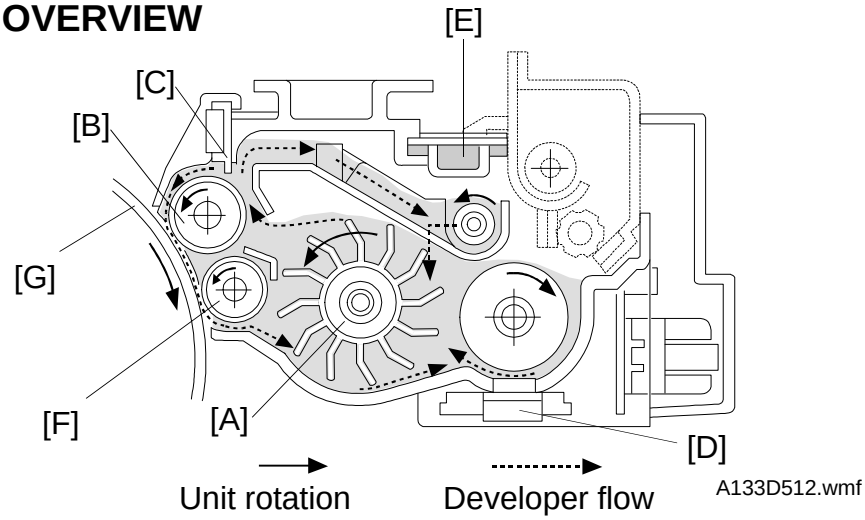
A133D620.wmf

To ensure that the laser beam does not accidentally switch on during servicing, there are two safety switches located at the front door. These two switches [A] are installed in series on the LD 5 V line coming from the dc power supply board.

When the front cover is opened, the power supply to the laser diode is interrupted.

7. DEVELOPMENT

7.1 OVERVIEW



This copier uses a double roller development (DRD) system.

The diameters of the two development rollers are different from each other because the position where the development unit contacts the drum is located slightly higher than in other models.

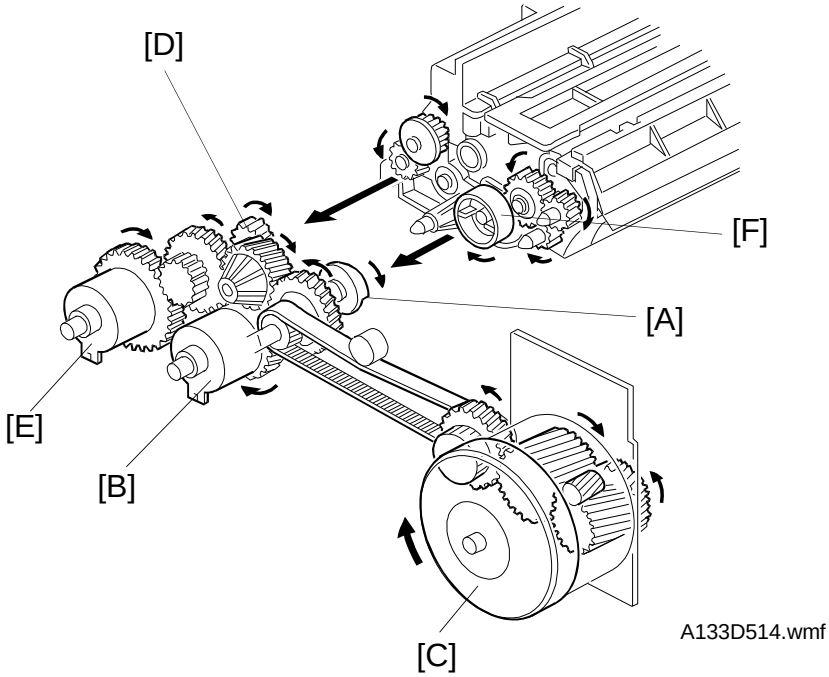
The DRD system differs from the single roller development system in that (1) the diameter of each development roller is narrower (narrower development nip against the drum), (2) each develops the image (the image is developed twice), and (3) the relative speed of each development roller against the drum is reduced. As a result, the image quality of black cross points and the trailing edges of halftone areas are improved.

Also, the use of finer toner (approx. 7.5 μm) improves image quality, especially of thin horizontal lines and dot screen areas.

The paddle roller [A] picks up developer in its paddles and transports it to the upper development roller [B]. Internal permanent magnets in the development rollers attract the developer to the development roller sleeve. The upper development roller carries the developer past the doctor blade [C]. The doctor blade trims the developer on the upper development roller to the desired thickness and creates backspill to the cross mixing mechanism. The development rollers continue to turn, carrying the developer to the drum [G] where the latent image is developed. After turning another 100 degrees, the developer is released and returned to the paddle roller [A].

The toner density sensor [D] located under the unit measures the toner concentration in the developer. There is a hole, fitted with a filter [E], in the top of the unit to relieve air pressure and to minimize toner scattering.

7.2 DRIVE MECHANISM

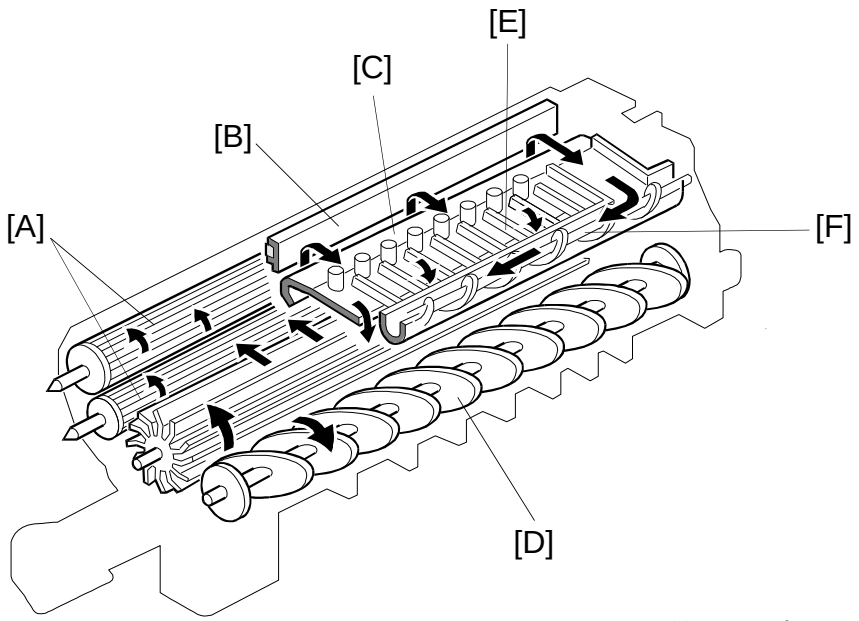


The development clutch [B] transfers main motor drive [C] to the development drive gear [A], which drives the gears in the development unit.

The gears in the toner supply unit are driven by the toner supply roller drive gear [D] when the toner supply clutch [E] activates.

All gears in the development unit are helical gears. These gears are quieter than normal gears. The teeth of the development drive gear are chamfered so they engage smoothly with the development roller gear [F] when the unit is installed.

7.3 CROSSMIXING

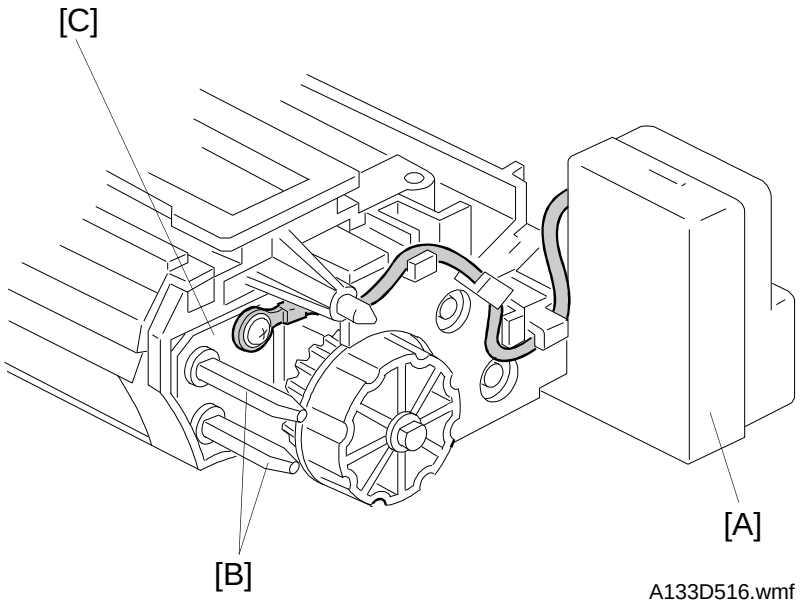


This copier uses a standard cross-mixing mechanism to keep the toner and developer evenly mixed. It also helps agitate the developer to prevent developer clumps from forming and helps create the triboelectric charge.

When the development rollers [A] turn, the developer on these rollers is split into two parts by the doctor blade [B]. The part that stays on the development rollers forms the magnetic brush and develops the latent image on the drum. The part that is trimmed off by the doctor blade goes to the backspill plate [C].

As the developer slides down the backspill plate to the agitator [D], the mixing vanes [E] move it slightly toward the rear of the unit. Part of the developer falls into the auger inlet and is transported to the front of the unit by the auger [F]. As the result of this mechanism, the developer stays level in the development unit.

7.4 DEVELOPMENT BIAS



This machine uses a negative-positive development system, in which black areas of the latent image are at a low negative charge (about -100 V) and white areas are at a high negative charge (about -850 V).

To attract negatively charged toner to the black areas of the latent image on the drum, the development bias power pack [A] applies a bias of –550 volts to the development rollers throughout the image development process. The bias is applied to both development roller shafts [B] through the development positioning plate [C].

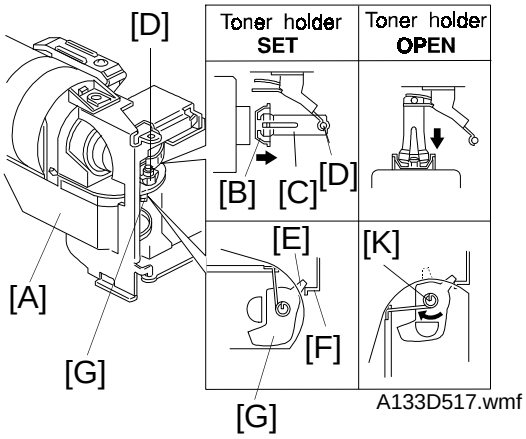
In stand-by mode, the development bias is 0V. When drum charging begins and the upper relay sensor detects the paper, the development bias is changed to +300 V. This is to prevent toner from transferring to the area of drum by the development roller, which has not yet been charged. After 70 ms, the development bias is then dropped to –550 V at the same time as the development clutch turns on.

The development bias voltage (-550 V) can be adjusted with SP2201-1.

The development bias for the ID sensor pattern is –310 V, which can be adjusted with SP2201-2.

7.5 TONER SUPPLY

7.5.1 Toner Bottle Replenishment Mechanism



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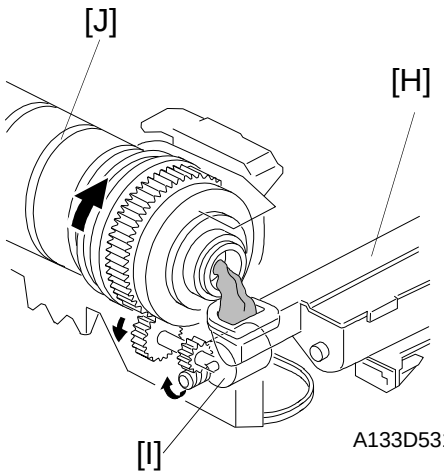


A133D531.wmf

When a toner cartridge is placed on the holder unit [A] and pushed back in completely, the following procedures are performed automatically to allow toner to be supplied to the toner supply unit.

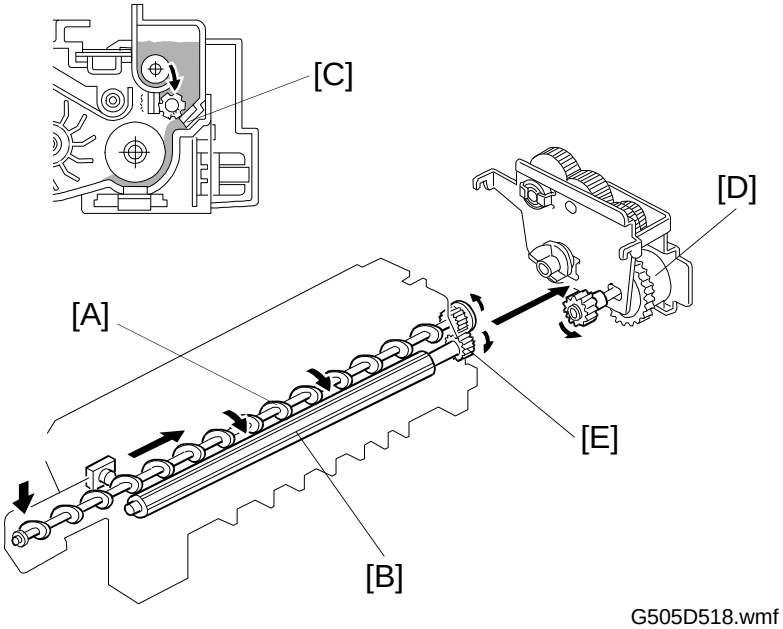
- The cap [B] remaining on the toner bottle is pulled away and kept by the chuck [C] away from the movement of the roller [D], which rides along the curved rail.
- The toner shutter lever [E] meets the bracket [F] on the copier frame and the toner shutter [G], which covers the hole above the toner supply unit opening, is opened.

The toner end detection system determines when to drive the toner bottle replenishment mechanism (see Toner End Detection). The bottle drive mechanism transports toner from the bottle to the toner supply unit [H]. A worm gear on the bottle drive motor [I] drives this mechanism. The toner bottle has a spiral groove [J] that helps move toner to the toner supply unit.

When the holder unit is pulled out to add new toner, the following procedures are performed automatically to prevent toner from scattering.

- The chuck releases the toner bottle cap into its proper position.
- The toner shutter shuts the opening as a result of the pressure from the torsion spring [K].

7.5.2 Toner Supply Mechanism



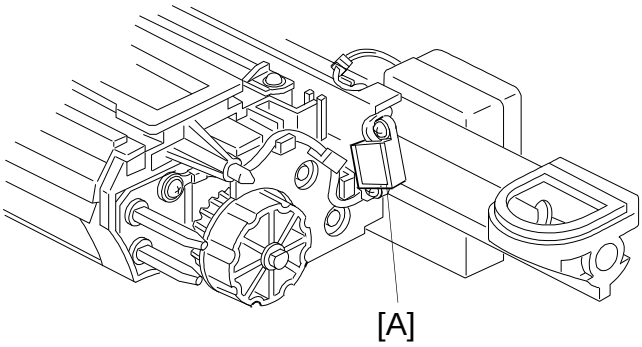
G505D518.wmf

Inside the toner supply unit are the transport screw [A] and the toner supply roller [B]. As the grooves in the toner supply roller turn past the slit [C], toner falls into the development unit.

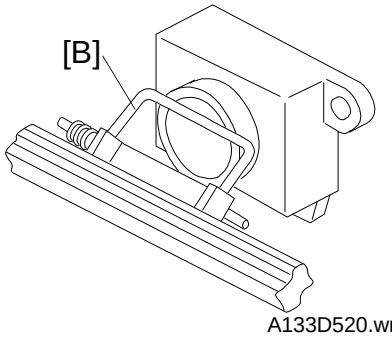
When the machine decides that it is time to add more toner to the developer (see Detect Supply Mode and Fixed Supply Mode in the Process Control section), the toner supply clutch [D] turns on. This clutch transfers rotation from the main motor to the toner supply roller gear [E], which drives the transport screw. In this way, toner is transported from the front to the rear.

For details on toner supply control, see the Process Control section.

7.5.3 Toner End Detection



A133D519.wmf



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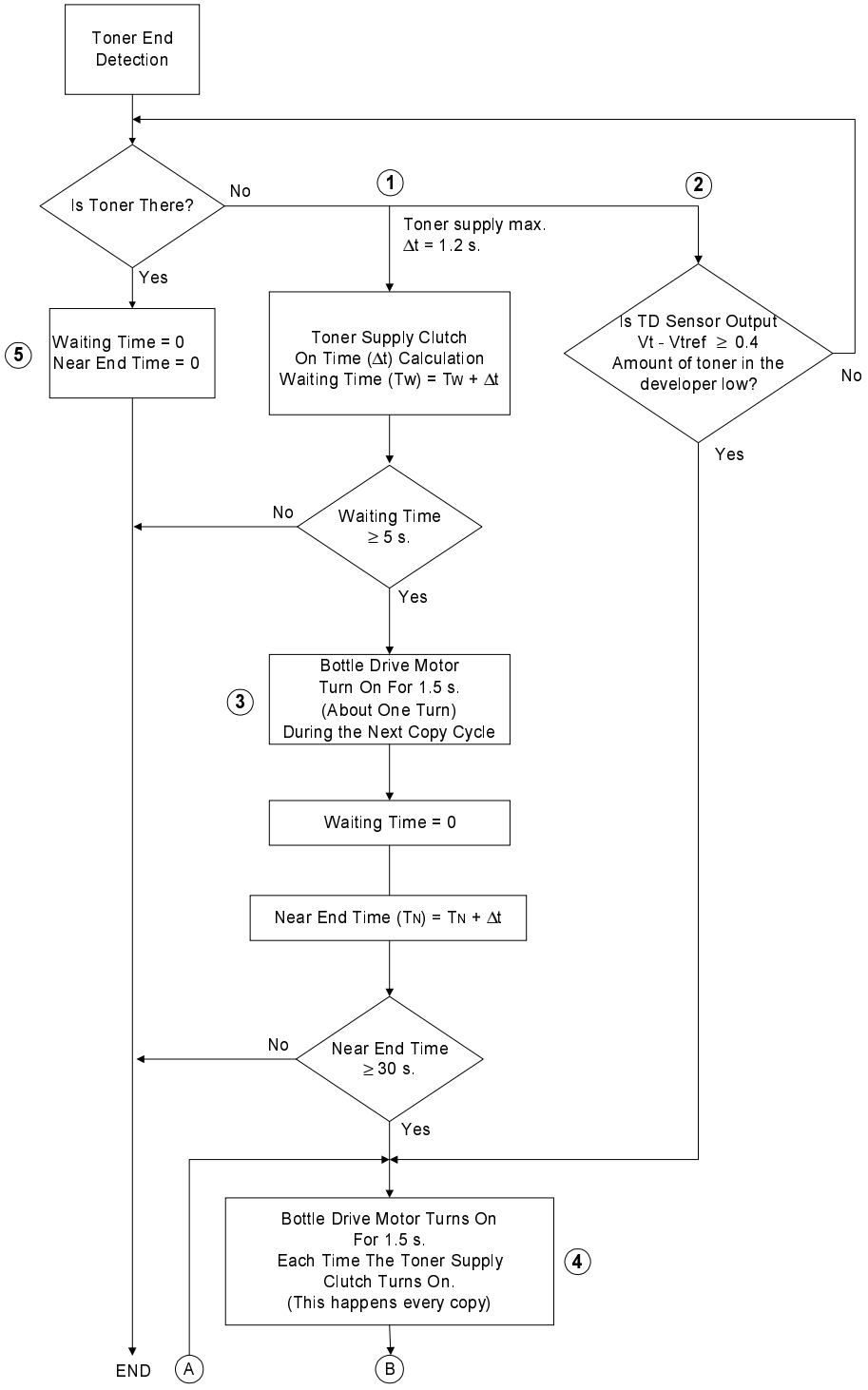
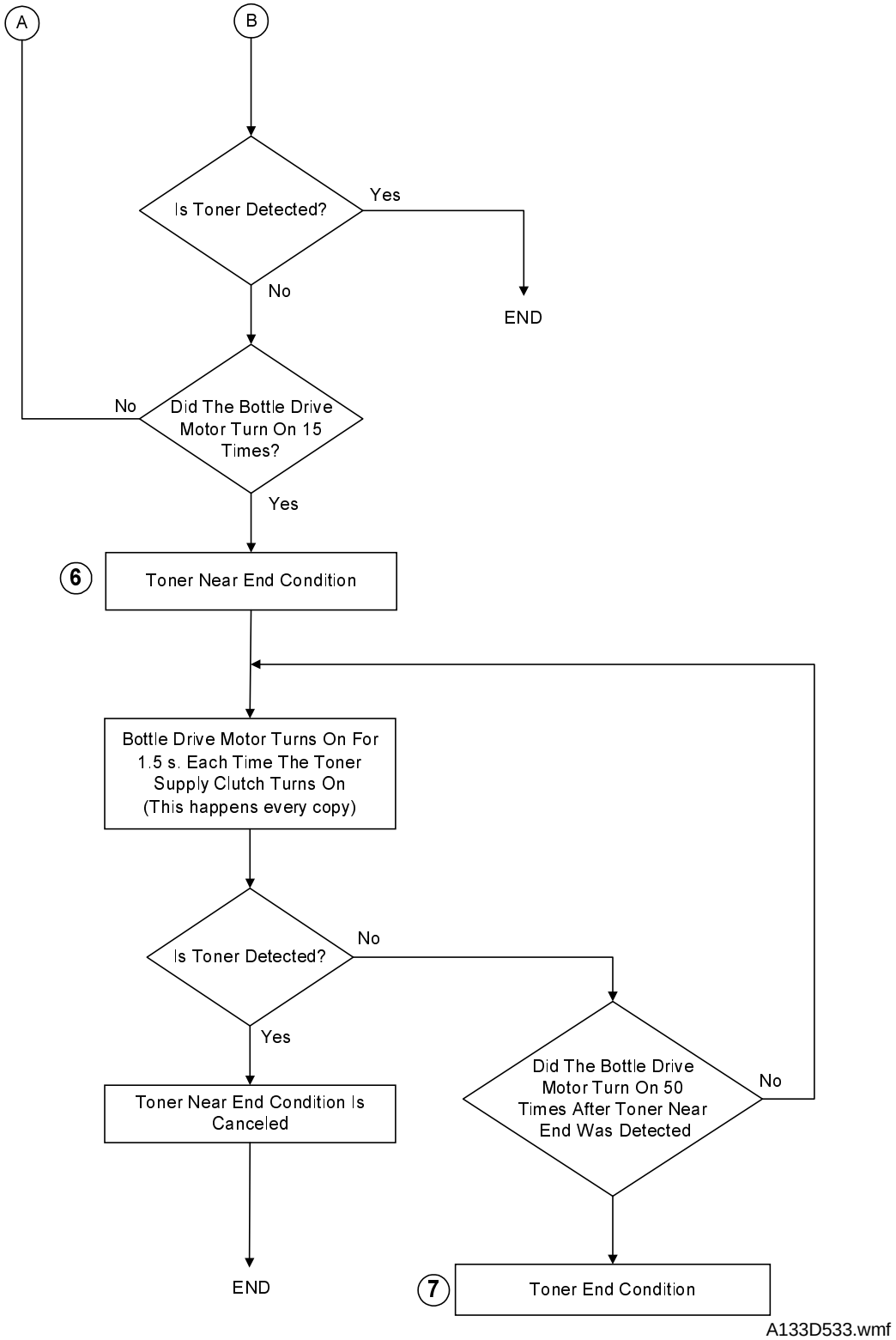
The toner end sensor [A] (which is a piezoelectric sensor) detects whether there is sufficient toner in the toner supply unit or not.

The toner end sensor surface is cleaned by the movement of the spring [B] attached to the transport screw in the toner supply unit.

Toner Near End/End Detection



A133D532.wmf


A
B
Is Toner Detected?
Yes
END
No
Did The Bottle Drive Motor Turn On 15 Times?
No
Yes
6
Toner Near End Condition
Bottle Drive Motor Turns On For 1.5 s. Each Time The Toner Supply Clutch Turns On (This happens every copy)
Is Toner Detected?
No
Yes
Toner Near End Condition Is Canceled
END
Did The Bottle Drive Motor Turn On 50 Times After Toner Near End Was Detected
No
7
Toner End Condition
A133D533.wmf

If the toner end sensor informs the cpu that there is no toner, two things happen.

- TD Sensor Check ("2" on the flow chart) -

The cpu checks the TD sensor to determine whether the amount of toner in the developer is low or not. If the amount of toner is low, the near-end determination procedure starts ("4" on the flow chart).

- Toner Supply Clutch Activation ("1" on the flow chart) -

The toner supply clutch on time is calculated (as explained in "Process Control" - section 2.2.5), and the toner supply clutch turns on for the amount of time calculated (max 1.2 s).

The machine adds up the total amount of time that the toner supply clutch has been on since the first time the toner end sensor gave a negative response. When this reaches a multiple of 5 s, the toner supply bottle is rotated for 1.5 s the next time a copy is made ("3" on the flow chart). If the time reaches 30 s, the toner near end determination process begins ("4" on the flow chart).

Note: If the toner near-end sensor detects toner, all timers are reset to zero ("5" on the flow chart).

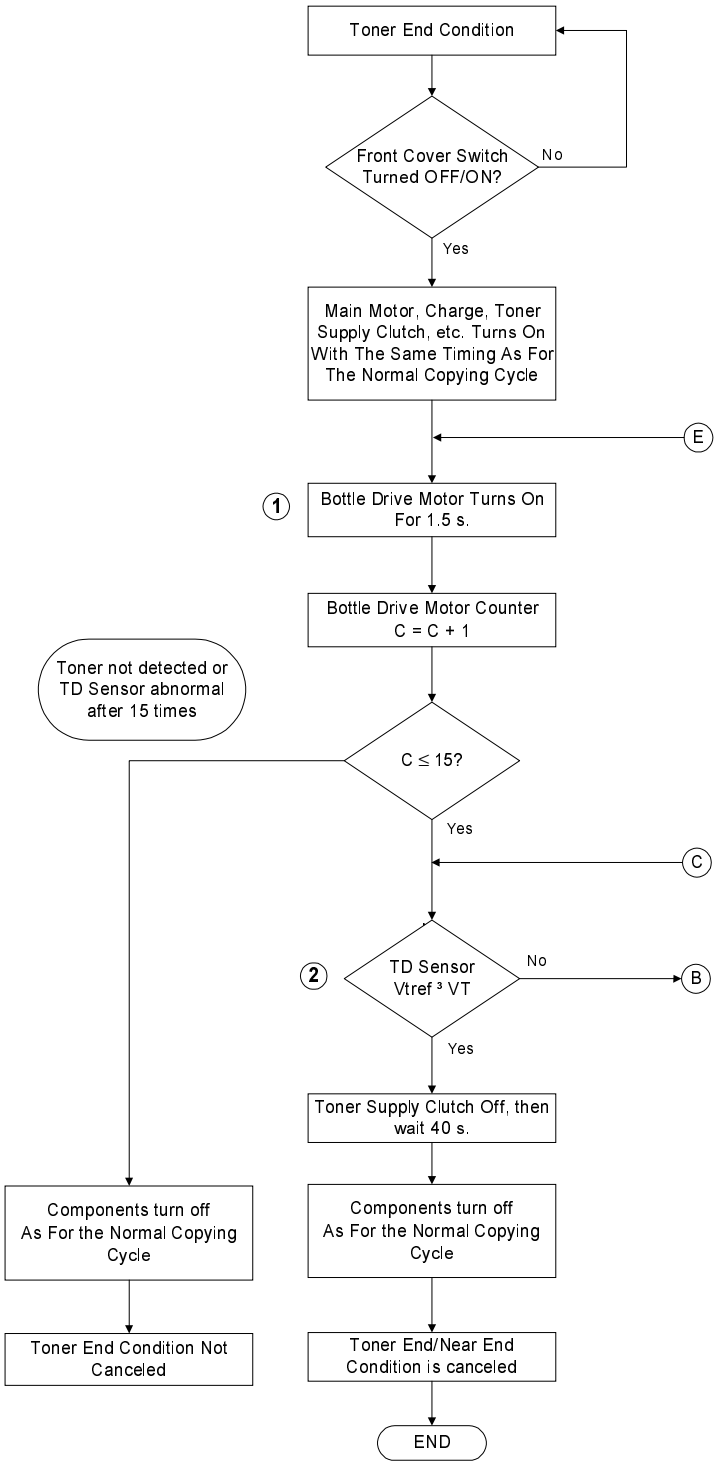
- Toner Near-end Determination -

Every copy, the toner supply clutch turns on for 1.5 s. If toner is still not detected after 15 copies, the machine detects a toner near-end condition ("6" on the flow chart).

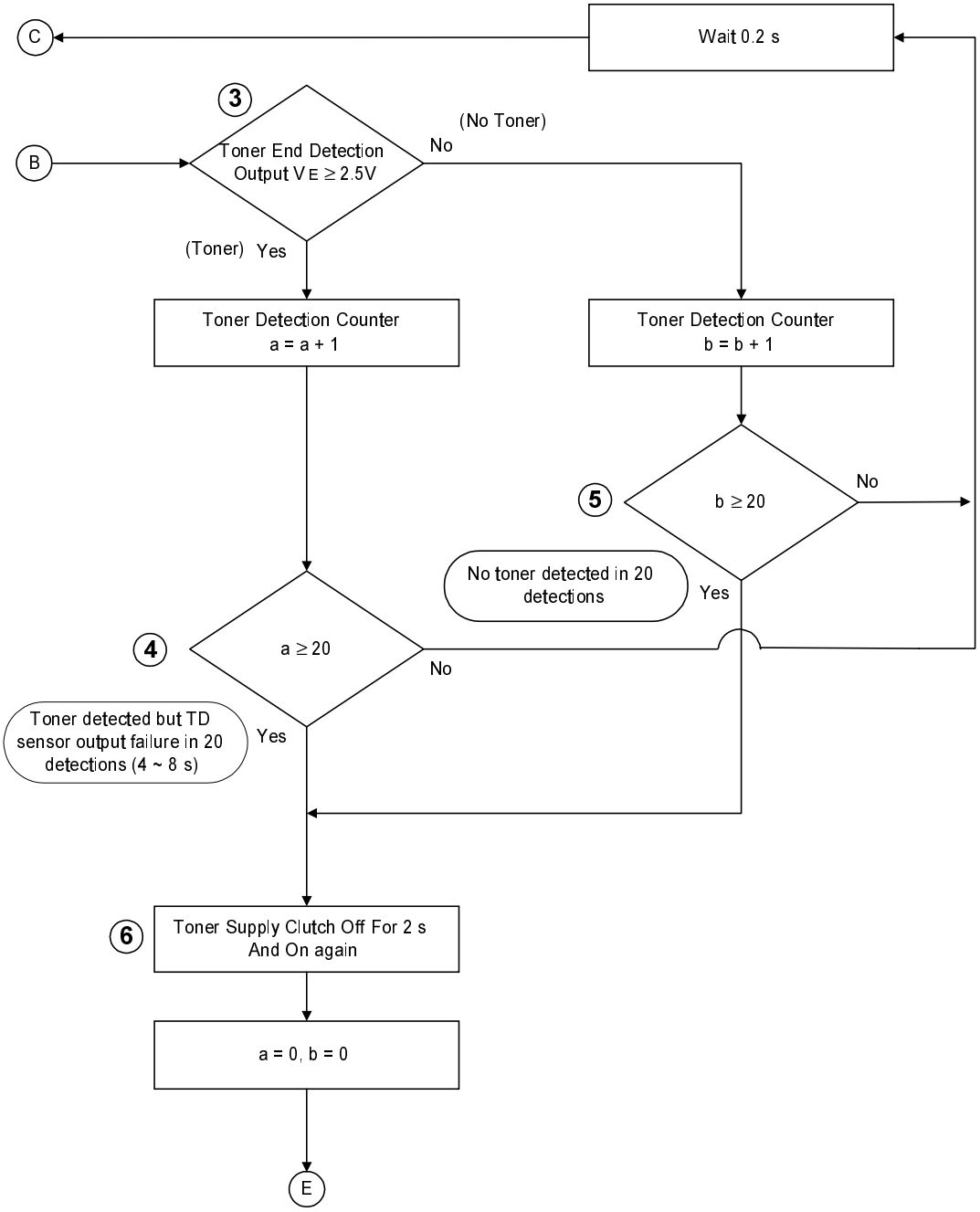
- Toner End Determination -

If toner is still not detected 50 copies after toner near-end was determined, the machine detects a toner end condition ("7" on the flow chart).

Toner End Recovery


Toner End Condition
Front Cover Switch Turned OFF/ON?
No
Yes
Main Motor, Charge, Toner Supply Clutch, etc. Turns On With The Same Timing As For The Normal Copying Cycle
E
1
Bottle Drive Motor Turns On For 1.5 s.
Bottle Drive Motor Counter C = C + 1
Toner not detected or TD Sensor abnormal after 15 times
C ≤ 15?
Yes
C
2
TD Sensor Vtref ³ VT
No
B
Yes
Toner Supply Clutch Off, then wait 40 s.
Components turn off As For the Normal Copying Cycle
Components turn off As For the Normal Copying Cycle
Toner End Condition Not Canceled
Toner End/Near End Condition is canceled
END

A133D534.wmf



A133D535.wmf

If the power is turned off/on while a toner end condition exists, the machine will attempt to recover.

First, toner is supplied for 1.5 s and the bottle drive motor counter (C) is incremented, ("1" on the flow chart).

Then the TD sensor is checked ("2" on the flow chart). If the user added fresh toner and the TD sensor is in order, the toner end condition is cancelled.

However, if the TD sensor detects that V_{TREF} is less than V_T, the amount of toner in the developer is still low (or the TD sensor is faulty). So the toner end sensor output is checked ("3" on the flow chart). The outputs from both the TD and the toner end sensor are checked until either a positive or negative result has been obtained from the toner end sensor 20 times.

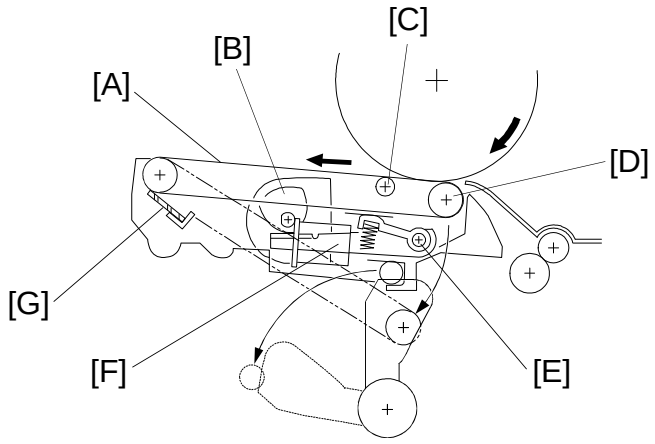
(If the toner end sensor detected toner at this point, either the TD sensor or the toner end sensor are defective ["4" on the flow chart]. However, SC codes are not generated during this procedure.)

Then, toner is supplied again ("6" on the flow chart), and the bottle drive motor counter (C) is incremented, ("1" on the flow chart).

If toner cannot be detected after this process has been done 15 times, the toner end condition is not cancelled.

8. IMAGE TRANSFER AND PAPER SEPARATION

8.1 OVERVIEW



A133D521.wmf

This model uses a transfer belt unit instead of a transfer and separation corona unit. The transfer belt unit consists of the following parts:

- Transfer belt [A]
- Transfer belt lift clutch [B]
- Transfer bias roller [C]
- Idle roller [D]
- Transfer belt lift lever [E]
- Transfer high voltage supply board [F]
- Transfer belt cleaning blade [G]

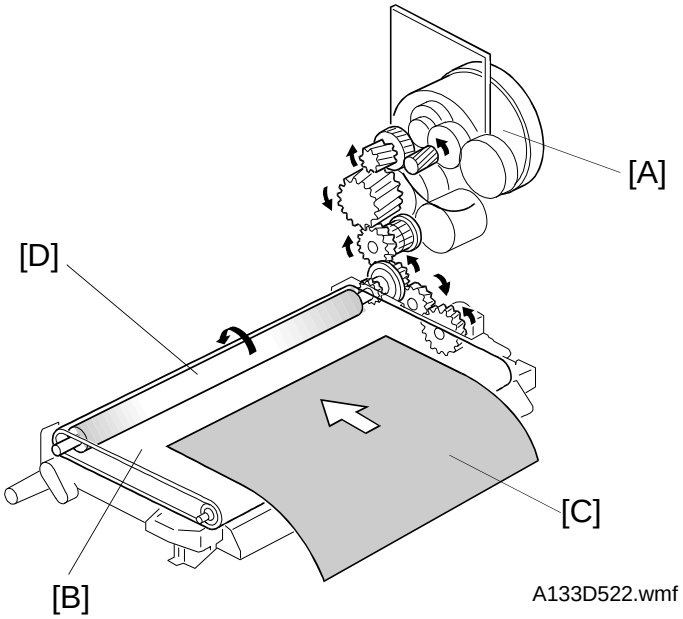
The belt (length: 334 mm) has a high electrical resistance, so it can hold a high positive electrical potential to attract toner from the drum onto the paper. Also, the electrical potential attracts the paper itself and helps to separate the paper from the drum.

The transfer belt cleaning blade removes toner from the transfer belt to prevent the back side of the paper from being stained.

The use of this system has the following advantages compared with the corona wire system.

- Contact with the full width of the drum to assure better transfer
- Stable paper separation and transportation
- Reduced ozone generation

8.2 PAPER TRANSPORTATION AND BELT DRIVE MECHANISM

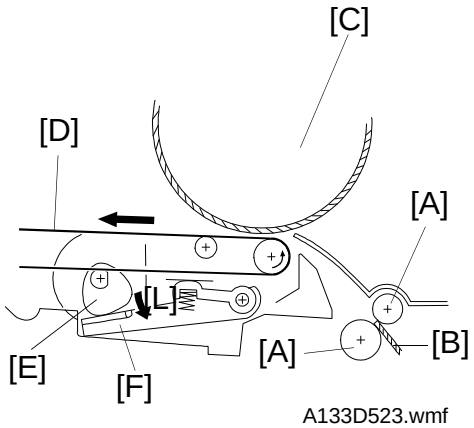


The main motor [A] drives the transfer belt [B] through a series of gears. Since the transfer belt attracts the paper [C] electrostatically, a transport fan is not required.

As a result of its own stiffness and the curvature of the belt, the paper separates from the transfer belt above the transfer belt drive roller [D] as the belt turns sharply around the transfer belt drive roller.

8.3 IMAGE TRANSFER AND PAPER SEPARATION MECHANISM

(1) The registration rollers [A] start feeding the paper [B] to the gap between the drum [C] and the transfer belt [D] at the proper time. The transfer belt does not contact the drum at this moment (the transfer belt lift clutch with cam [E] is pushing down the transfer belt lift lever [F]).



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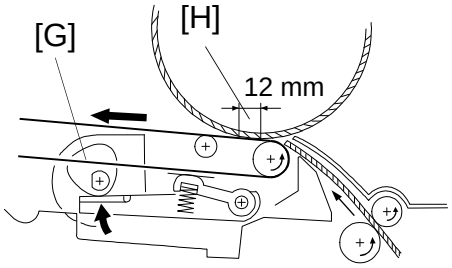
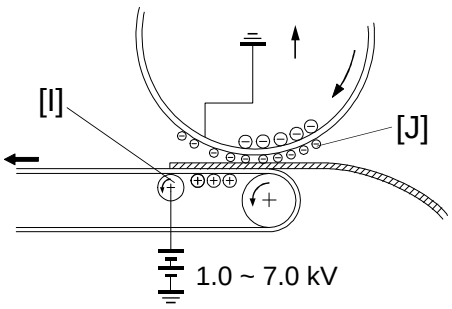
(2) Before the leading edge of the paper reaches the gap between the transfer belt and the drum, the transfer belt lift clutch [G] rotates half of a complete rotation to release the lift lever. Then, the transfer belt is pushed up as a result of spring pressure. The contact width [H] is about 12 mm.



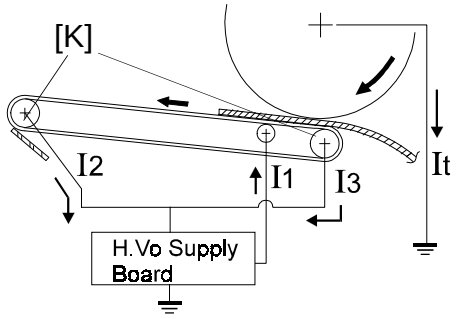
A133D524.wmf

(3) Then a potential of 1.0 ~ 7.0 kV is applied to the transfer bias roller [I]. The positive charge attracts the negatively charged toner [J] from the drum. It also attracts the paper and separates the paper from the drum.



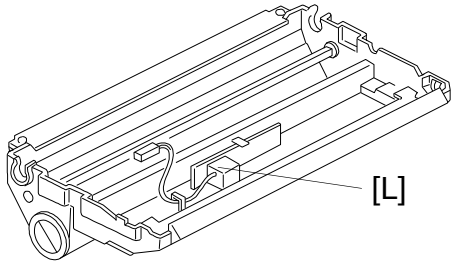
A133D525.wmf

(4) After the image transfer is completed, the charge on the transfer belt holds the paper on the transfer belt. Excess charge on the paper and the transfer belt is discharged during rotation via the grounded rollers [K].



A133D526.wmf

When the transfer high voltage supply board [L] inside the transfer belt unit provides high voltage to the transfer bias roller, a small current (I_t) flows to ground via the transfer belt, the paper, and the drum.

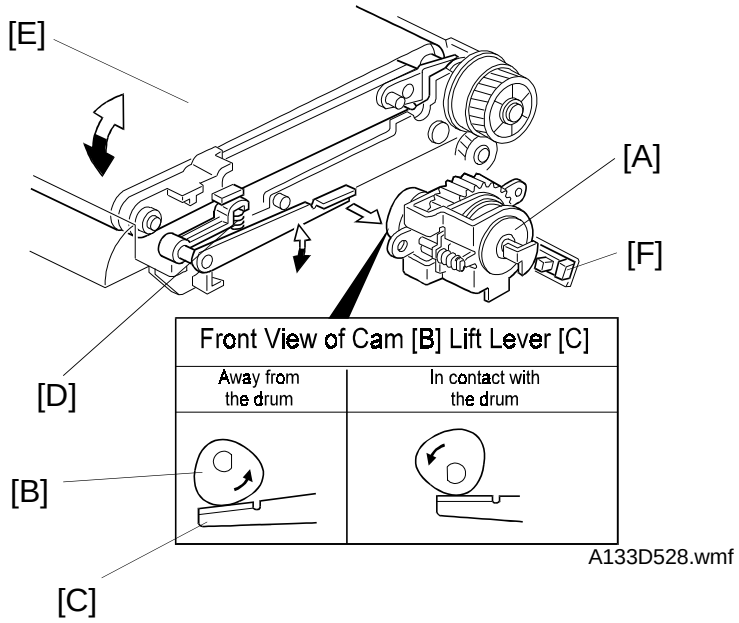


A133D527.wmf

It is important that this current stays constant even if the paper thickness, type, environmental conditions, or the transfer belt surface resistance change. If it is not kept constant, efficiency of toner transfer and paper separation will vary with humidity and paper thickness.

$I_t = I_1 - (I_2 + I_3)$. The high voltage supply board measures I_2 and I_3, and varies I_1 (the current to the bias roller) to keep I_t constant.

8.4 TRANSFER BELT UNIT LIFT MECHANISM

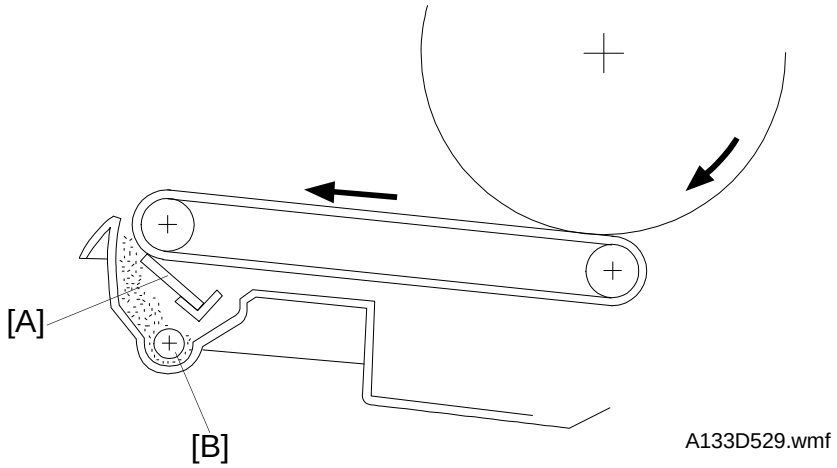


The transfer belt lift clutch [A] (a half turn clutch) located on the back of the copier turns on and the cam [B] rotates half of a complete rotation. The lift lever [C], riding on the cam is lifted up and the spring [D] pushes up the transfer belt [E] for it to contact the drum.

The transfer belt contact home position sensor [F] is used to detect the home position of the cam (this is when the transfer belt is away from the drum). The transfer belt must be released from the drum while it is not being used for image transfer. The reasons are as follows:

- To prevent sensor patterns on the drum from being rubbed off by the transfer belt, because the transfer belt is located between the development unit and the ID sensor
- To prevent a change in the drum's OPC characteristics because of the influence of additives inside the rubber belt
- To prevent the transfer belt cleaning mechanism from being overworked

8.5 TRANSFER BELT CLEANING MECHANISM



Some toner may adhere to the transfer belt under the following conditions:

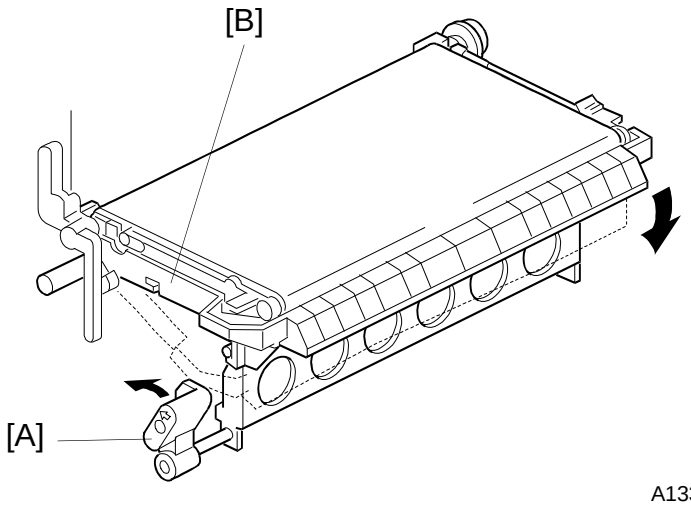
- When a paper jam occurs.
- When the size of the paper on the by-pass table is different from the one determined by the width sensor on the by-pass feed table. The machine always assumes that the paper on the by-pass table is lengthwise. For example, if the sensor detects A3 width, the machine scans the full A3 area of the exposure glass. However, if the paper was actually A4 sideways, the part of the platen cover after the original's trailing edge will be scanned and excess toner could be transferred.

The adhering toner must be removed to prevent the back side of later copies from being stained. The cleaning blade [A], which is always in contact with the transfer belt, scrapes off any toner remaining on the transfer belt. Paper dust on the transfer belt is also scraped off, and is disposed of with the waste toner from the transfer belt. A counter blade system is used to clean the transfer belt. The surface of the transfer belt is coated to make it smooth and to prevent the cleaning blade from being flipped by the transfer belt.

To remove toner and other particles that are accumulated at the edge of the cleaning blade, the transfer belt turns in reverse at the end of every copy job like for the drum cleaning blade mechanism.

The toner and paper dust that is scraped off fall into the toner collection coil [B] which then carries them to the toner collection bottle.

8.6 TRANSFER BELT UNIT RELEASE MECHANISM

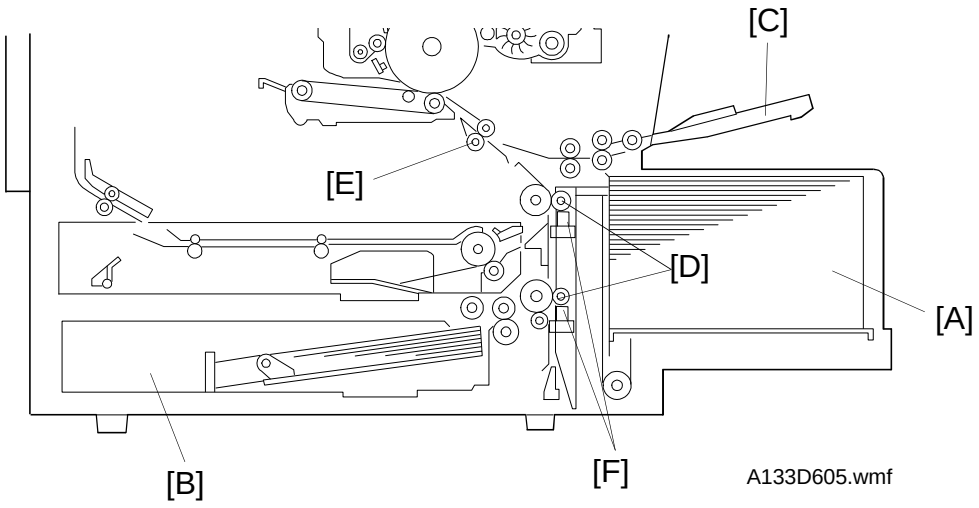


A133D530.wmf

When the transfer belt unit release lever "A1" [A] is rotated counterclockwise, the transfer belt unit [B] is released, allowing it to drop. This mechanism allows easy paper jam recovery and easy maintenance of the transfer belt unit.

9. PAPER FEED AND REGISTRATION

9.1 OVERVIEW



This model has three paper feed stations: the large capacity tray feed station [A], the paper tray feed station [B], and the by-pass feed station [C].

The LCT holds 1000 sheets of paper. The paper tray is a drawer tray that holds 500 sheets of paper.

Paper can also be fed using the by-pass feed table, which uses the feed mechanism of the LCT feed station. The by-pass feed table can hold 40 sheets of paper.

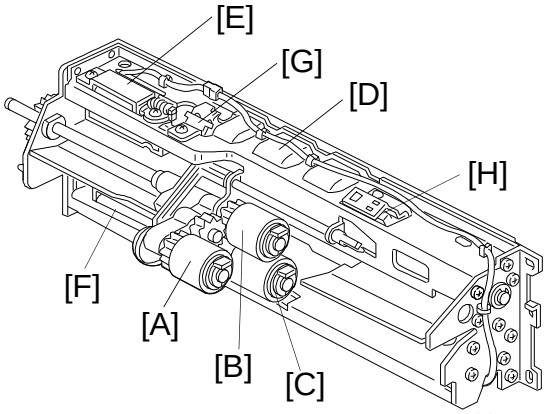
The paper tray feed station uses an FRR feed system.

The top sheet of paper separates from the stack and is fed to the relay rollers [D], then to the registration rollers [E].

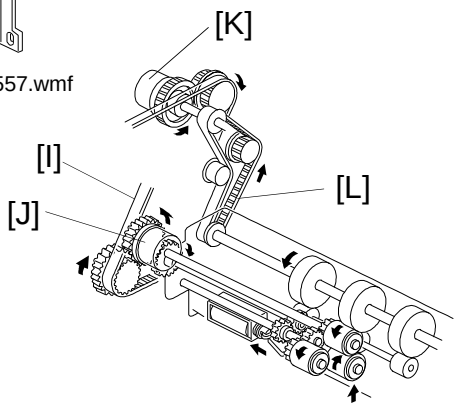
There are two relay sensors [F], one located just under each set of relay rollers. These sensors are used for paper jam detection.

9.2 PAPER FEED MECHANISM - PAPER TRAY

9.2.1 Drive Mechanism



A133D557.wmf



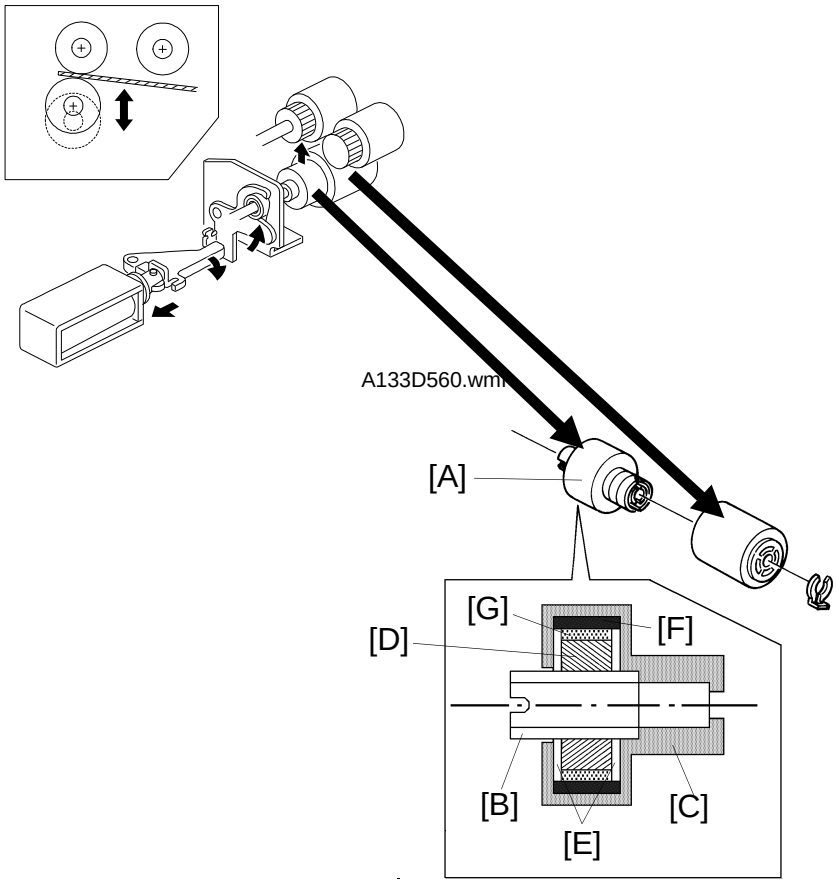
A133D559.wmf

The paper feed unit consists of a pick-up roller [A], feed roller [B], separation roller [C], relay roller [D], pick-up solenoid [E], separation solenoid [F], paper upper limit sensor [G], and paper end sensor [H].

The pick-up, feed, and separation rollers are driven by the main motor via the timing belt [I] and the paper feed clutch [J]. The relay roller is also driven by the main motor. However, drive is transmitted to the relay roller via the relay clutch [K] and the timing belt [L].

In standby mode, the separation roller is away from the feed roller.
At 50 ms after the Start key was pressed, the main motor and the separation solenoid turn on. Then the separation roller contacts the feed roller.
At 100 ms after the main motor started to rotate, the pick-up solenoid turns on. The pick-up roller lowers to make contact with the top of the paper stack. The pick-up solenoid stays on for 550 ms.
At 200 ms after the main motor started to rotate, the paper feed clutch and the relay clutch turn on. The feed roller and relay rollers feed the top sheet of the paper stack to the registration rollers. When the leading edge of the paper passes through the upper relay sensor, the paper feed clutch is de-energized.

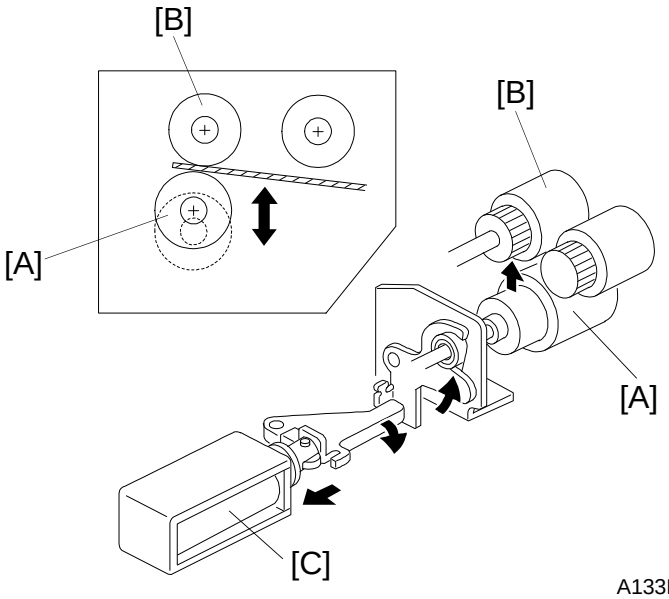
9.2.2 Slip Clutch Mechanism



The separation roller is mounted on a slip clutch. The slip clutch [A] consists of an input hub [B] and an output hub [C], which also acts as the case of the clutch. A magnetic ring [D] and steel spacers [E] are fitted onto the input hub. A ferrite ring [F] is fitted into the output hub. Ferrite powder [G] packed between the magnetic ring and the ferrite ring generates a constant torque due to magnetic force. The input hub and the output hub slip when the rotational force exceeds this constant torque. The constant torque prevents double feeding, because it exceeds the coefficient of friction between sheets of paper.

This type of slip clutch does not require lubrication.

9.2.3 Separation Roller Release Mechanism



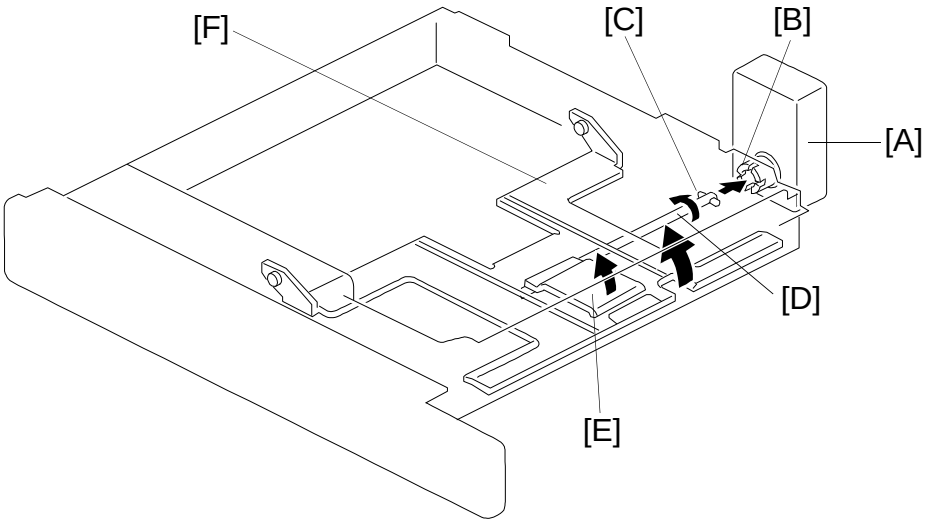
A133D560-1.wmf

This FRR mechanism uses a separation roller release system. The separation roller [A] is normally away from the feed roller [B]. When the paper feed station has been selected and the Start key is pressed, the separation solenoid [C] moves the separation roller into contact with the feed roller.

This mechanism has the following three advantages:

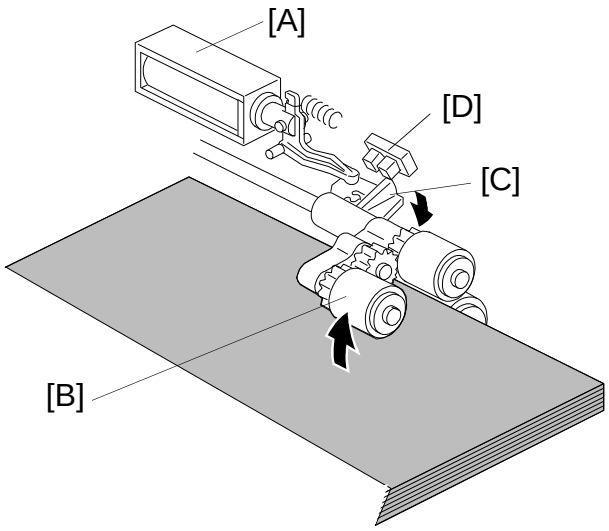
- If the separation roller is normally away from the feed roller, it reduces the wear on the rubber surface of the separation roller that is caused by friction between the feed roller and the separation roller.
- With other types of mechanism, a sheet of paper sometimes remains between the feed roller and the separation roller after paper feeding is completed. If the feed tray is drawn out in this condition, it is possible for this sheet of paper to be torn. When the separation roller is away from the feed roller, the remaining sheet of paper is released from between the feed roller and the separation roller.
- When paper misfeeds occur in this area, users can easily pull out paper jammed between the feed roller and the separation roller because the separation roller is away from the feed roller.

9.3 PAPER LIFT MECHANISM - PAPER TRAY

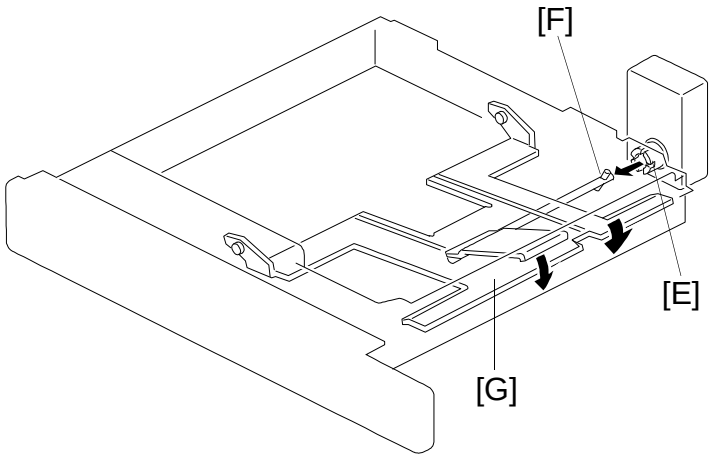


A133D563.wmf

The tray switch detects when the tray is placed in the machine. When the machine detects that the paper tray is in the machine, the tray lift motor [A] rotates and the coupling gear [B] on the tray lift motor engages the pin [C] on the lift arm shaft [D]. Then the tray lift arm [E] lifts the tray bottom plate [F].



A133D564.wmf



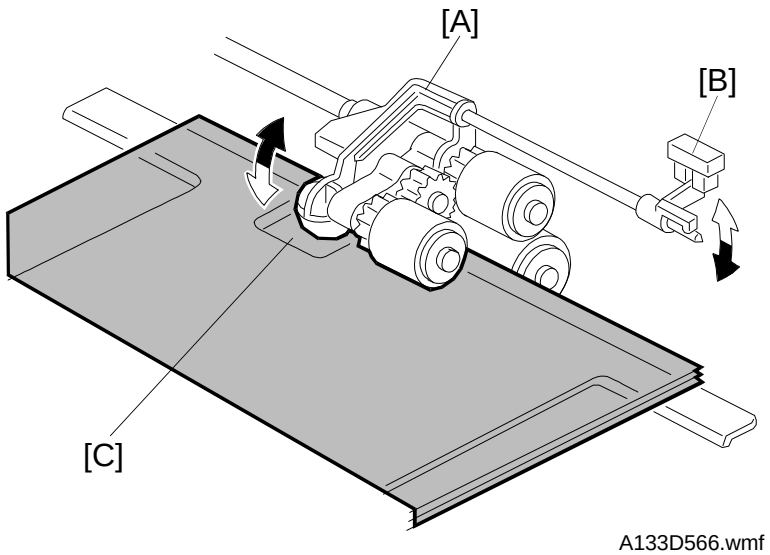
A133D565.wmf

When the tray lift motor turns on, the pick-up solenoid [A] activates to lower the pick-up roller [B]. When the top sheet of paper reaches the proper height for paper feed, the paper pushes up the pick-up roller, and the actuator [C] on the pick-up roller supporter activates the paper upper limit sensor [D] to stop the tray lift motor.

After several paper feed cycles, the paper level gradually lowers and the upper limit sensor is de-activated. The tray lift motor turns on again until this sensor is activated again.

When the tray is drawn out of the machine, the tray lift motor coupling gear [E] disengages the pin [F] on the lift arm shaft, and the tray bottom plate [G] then drops under its own weight.

9.4 PAPER END DETECTION - PAPER TRAY

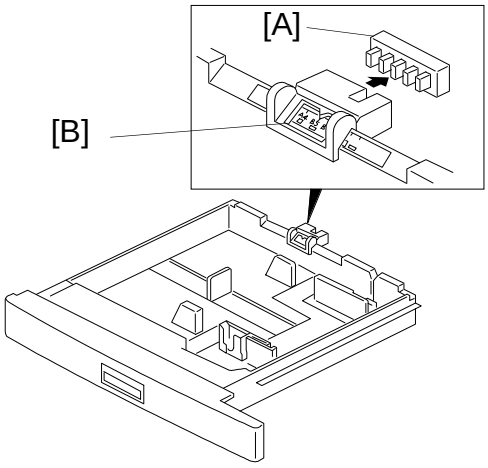


If there is some paper in the paper tray, the paper end feeler [A] is raised by the paper stack and the paper end sensor [B] is deactivated.

When the paper tray runs out of paper, the paper end feeler drops into the cutout [C] in the tray bottom plate and the paper end sensor is activated.

When a paper end condition occurs, the tray lift motor lowers the paper bottom plate and the pick-up solenoid turns off.

9.5 PAPER SIZE DETECTION - PAPER TRAY



A133D567.wmf

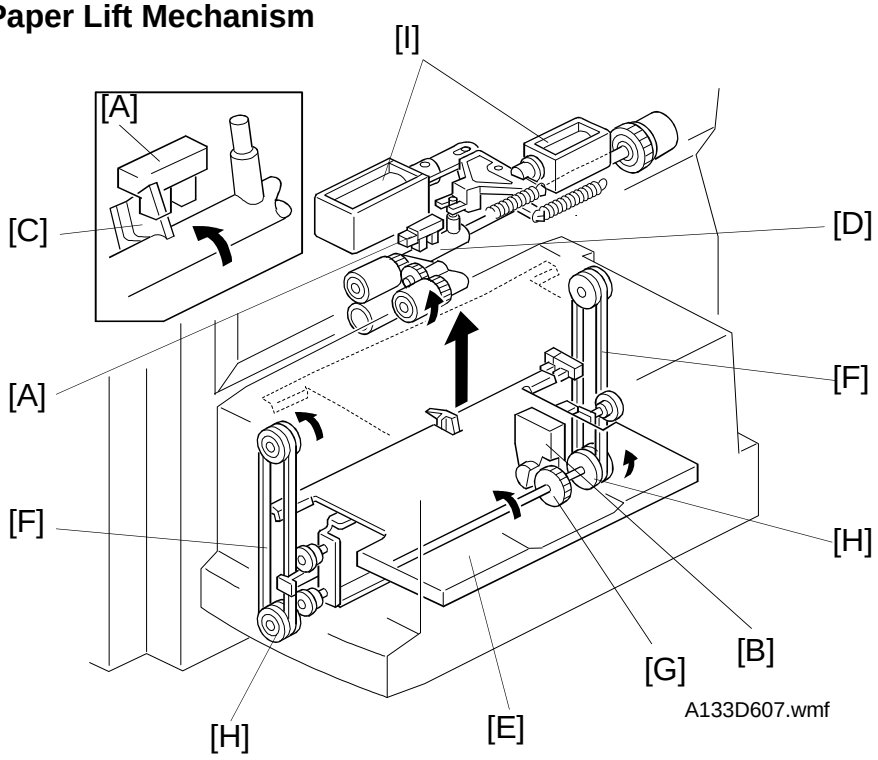
Actuated = 0 Deactuated = 1 1 2 3 4 5	Paper size	L: Lengthwise S: Sideways
	A4/A3 Version	LT/DLT Version
01111	A3-L	11" x 17"
00111	B4-L	8 1/2" x 14"
10011	A4-L	8 1/2" x 11"
01001	A4-S	11" x 8 1/2"
00100	B5-L	8 1/2" x 5 1/2"
00010	B5-S	A3
00001	A5-S	A4-L
10000	8 1/2" x 11"	A4-S
11000	11" x 8 1/2"	A5-S
11100	F/F4	F/F4
11110	*	*

The paper size switch [A] detects the paper size. The paper size switch has five microswitches inside. The paper size sensor is actuated by an actuator plate [B] located on the rear of the tray. The actuator is slid across to match the paper size. Each paper size has its own unique combination of switch states, as shown in the table. The CPU determines the paper size by the signal combination from the sensor.

Using a UP mode, the paper tray can be set up to accommodate one of a wider range of paper sizes. If this is done, the readings from the paper tray's sensor are ignored. If a different size of paper is used without changing the UP mode, paper jams will result.

9.6 LARGE CAPACITY TRAY

9.6.1 Paper Lift Mechanism



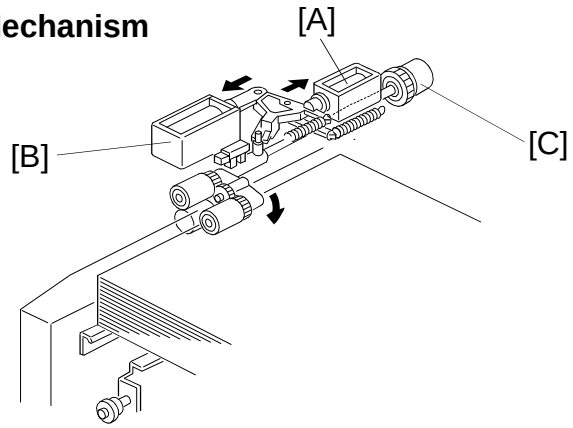
The LCT upper limit sensor [A] above the paper feed upper guide plate controls the LCT lift motor [B]. The actuator [C] for the sensor is on the pick-up roller shaft [D]. The LCT lift motor drives the LCT bottom plate [E] which is attached to the timing belts [F] through the helical gear [G] and drive pulleys [H].

When the LCT top cover is closed, the LCT cover switch actuates and both pick-up solenoids [I] are energized. The pick-up roller shaft then lowers and the LCT upper limit sensor is deactivated. At this time, the LCT lift motor starts rotating and the LCT bottom plate starts lifting.

When the top sheet of the paper stack raises the pick-up roller, the LCT upper limit sensor is activated and the LCT lift motor stops. Shortly after, the pick-up solenoids turn off and the pick-up roller goes back to the up position.

During the copy cycle, the pick-up roller is lowered to prepare for feeding the next sheet of paper. When the level of the paper stack has fallen past a certain point, the LCT upper limit sensor becomes deactivated and the LCT lift motor turns on to maintain the correct level for paper feed.

9.6.2 Paper Feed Mechanism

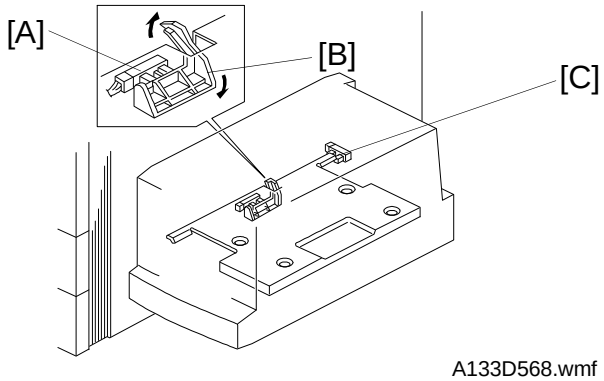


A133D608.wmf

The LCT uses an FRR feed system. Unlike for the paper tray, the feed and separation rollers are always in contact. The LCT pick-up solenoid [A], by-pass pick-up solenoid [B], and by-pass feed clutch [C] control paper feed from the LCT. When the Start key is pressed, the by-pass pick-up solenoid [B] turns on, and stays on until the copy run has finished. The pick-up roller is now at the bypass feed level.

At 150 ms after the Start key is pressed, the LCT pick-up solenoid turns on to drop the pick-up roller all the way to the LCT feed level. Then, 100 ms after this, the by-pass feed clutch turns on to feed the top sheet of paper. Between sheets of paper, solenoid [A] turns off, but solenoid [B] stays on.

9.6.3 Paper End Detection



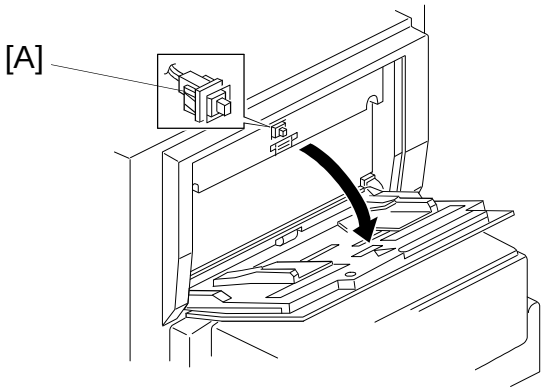
A133D568.wmf

The LCT paper end sensor [A] is just under the LCT bottom plate.

When the LCT runs out of paper, the actuator [B] pivots into the LCT paper end sensor. Then the LCT lift motor starts to rotate in reverse to lower the LCT bottom plate. When the LCT lower limit sensor [C] is activated by the bottom plate, the LCT lift motor stops.

9.7 BY-PASS FEED TABLE

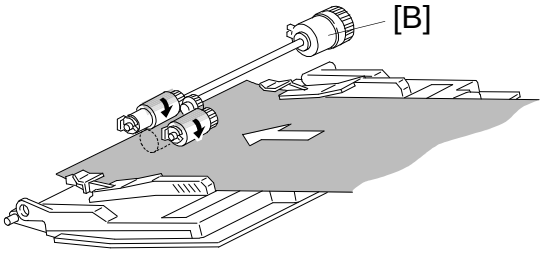
9.7.1 Table Open/Closed Detection



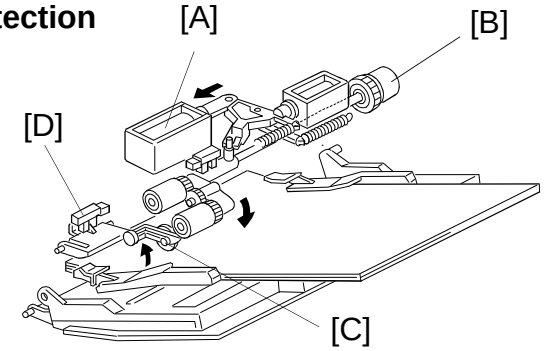
A133D602.wmf

The by-pass feed table switch [A] detects when the by-pass feed table is opened. Then the CPU turns on the by-pass feed indicator on the operation panel.

9.7.2 Feed Mechanism/Paper End Detection



A133D569.wmf



A133D604.wmf

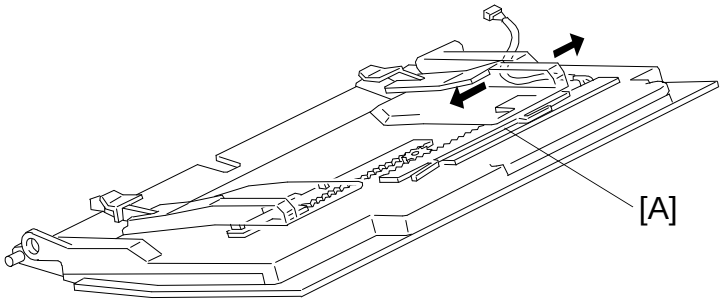
The by-pass feed table uses an FRR feed system, using the same rollers as the LCT, and one of the solenoids. Only the by-pass pick-up solenoid [A] is used, because the pick-up roller does not have to drop so far as it does when feeding from the LCT.

The user can put up to 40 sheets of paper on the by-pass feed table. Note that the paper can be pushed right into the machine, causing jams. The user must stop pushing the paper in when the by-pass feed indicator goes out.

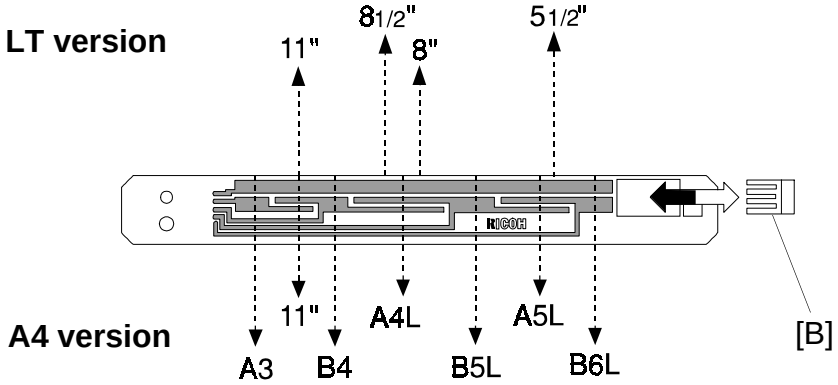
When the Start key is pressed, the by-pass feed clutch [B] and the pick-up solenoid turn on to feed the top sheet of paper.

When there is no paper on the by-pass feed table, the paper end feeler [C] drops into the cutout in the lower guide plate and the by-pass feed paper end sensor [D] is deactivated.

9.7.3 By-pass Feed Paper Width Detection



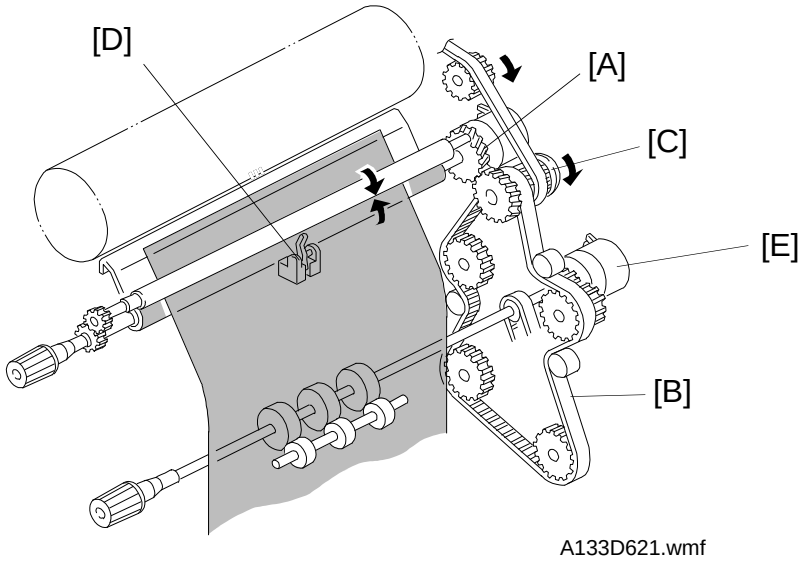
A133D570.wmf



A133D571.wmf

The by-pass feed paper width sensor board [A] monitors the paper width. The rear side fence is connected to the terminal plate [B]. When the side fences are moved to match the paper width, the terminal plate slides along the wiring patterns on the detection board. The patterns for each paper width on the paper width detection board are unique. Therefore, the machine determines which paper width has been placed in the by-pass feed table by the signal output from the board. However, the machine will not determine the paper length. For example, A4 paper set sideways will be determined to be A3 paper.

9.8 PAPER REGISTRATION



Main motor rotation is transmitted to the registration clutch gear [A] (located on the lower registration roller shaft) through the timing belt [B] and the relay gear [C].

The registration sensor [D] is positioned just before the registration rollers.

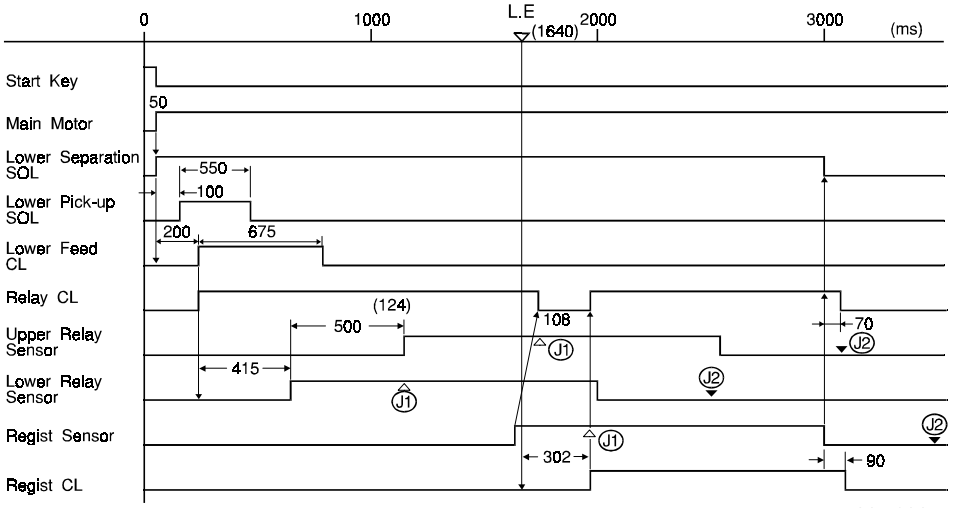
When the paper leading edge activates the registration sensor, the registration clutch is off and the registration rollers are not turning. However, the relay clutch [E] stays on for an extra 108 ms. This delay allows time for the paper to press against the registration rollers and buckle slightly to correct skew. Then, the registration clutch energizes and the relay clutch re-energizes at the proper time to align the paper with the image on the drum. The registration and relay rollers feed the paper to the image transfer section.

The registration sensor is also used for paper misfeed detection.

9.9 PAPER FEED AND MISFEED DETECTION TIMING

9.9.1 Paper Feed Tray

A4 sideways



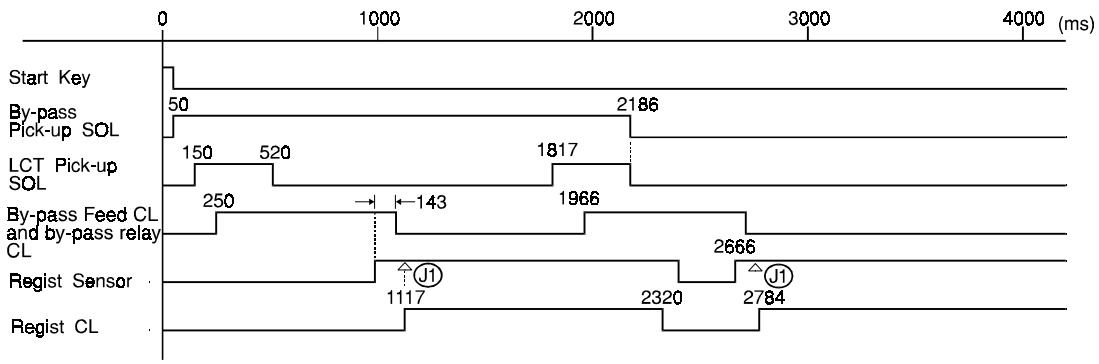
A133D622.wmf

L.E. (Leading Edge): Start Time for Scanning the Original

J1: Checks whether the sensors (relay sensors and registration sensor) are activated within 500 ms after the designated time for these sensors.

J2: Checks whether the sensors (relay sensors and registration sensor) are deactivated within 667 ms after the designated time for these sensors.

9.9.2 A4 sideways; two copies of a single-page original

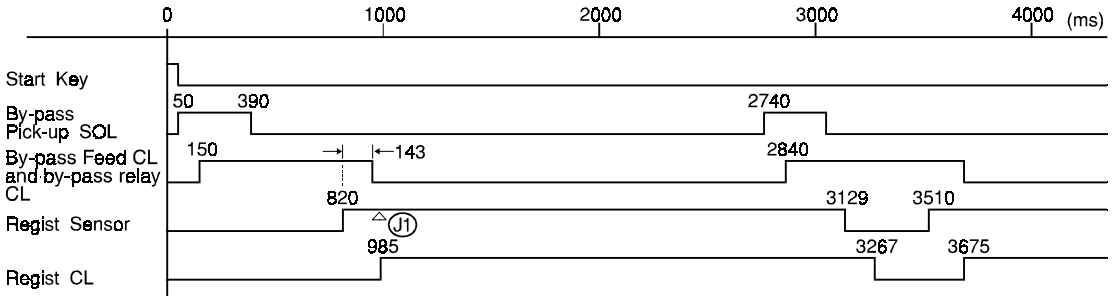


A133D623.wmf

J1: Checks whether the registration sensor is activated when the registration clutch is turned on.

9.9.3 By-pass Feed

A4 sideways

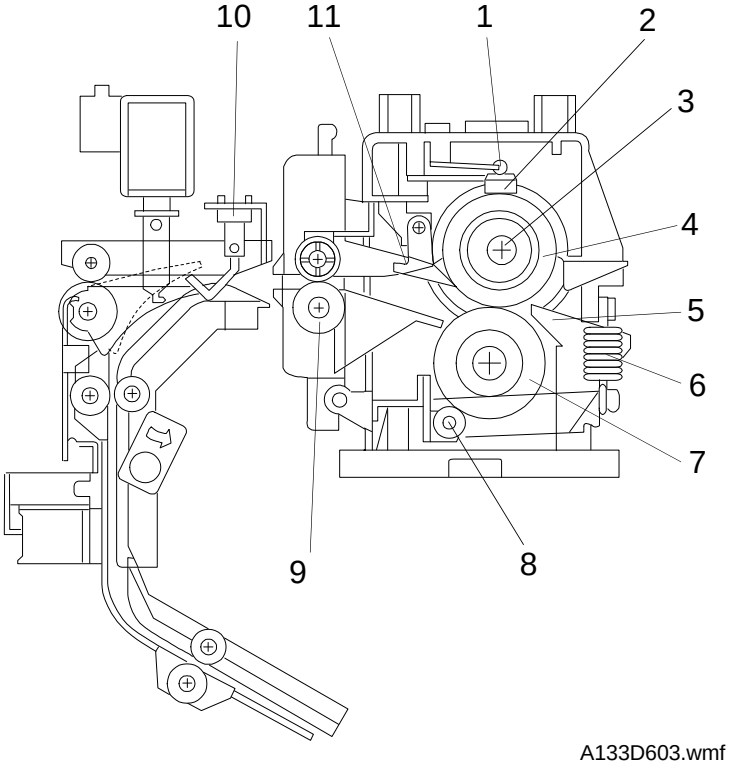


A133D624.wmf

J1: Checks whether the registration sensor is activated when the registration clutch is turned on.

10. IMAGE FUSING

10.1 OVERVIEW



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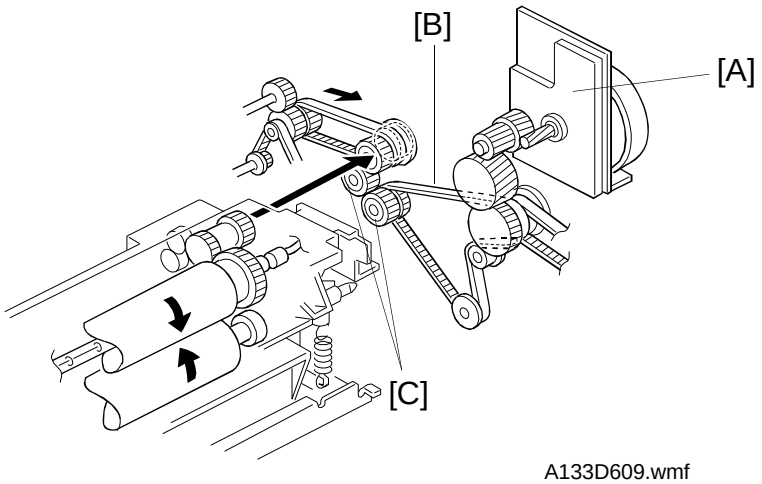
The fusing unit consists of the following parts:

1. Thermofuse
2. Thermistor
3. Fusing lamp
4. Hot roller
5. Lower entrance guide
6. Pressure springs
7. Pressure roller
8. Cleaning roller
9. Fusing exit roller
10. Fusing exit sensor
11. Hot roller strippers

10.2 FUSING DRIVE AND RELEASE MECHANISM



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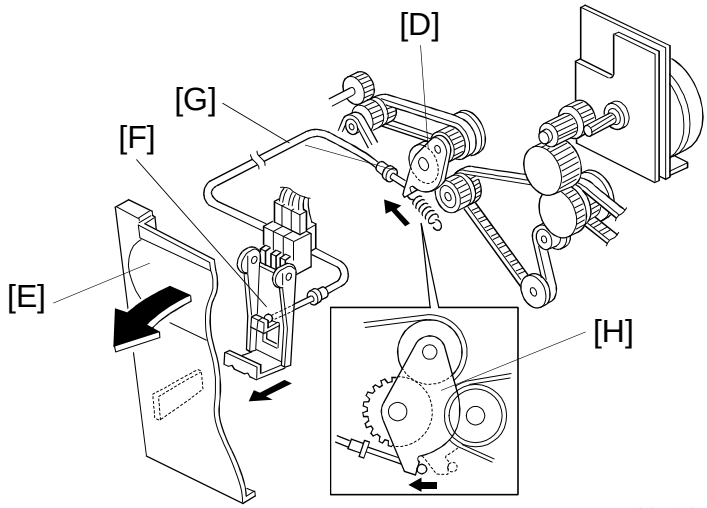

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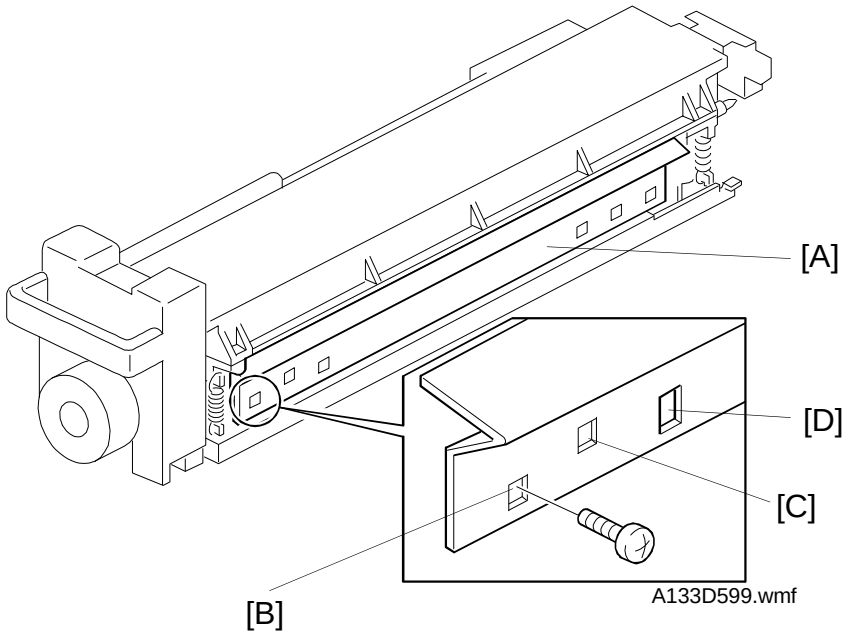
The main motor [A] drives the fusing unit through a timing belt [B] and some gears [C].

The fusing unit drive release mechanism automatically disengages the fusing unit drive gear [D] when the front cover [E] is opened. This allows the fusing unit drive gear to rotate freely so that misfed paper can be easily removed.

When the front cover is opened, the actuator plate [F] pulls release wire [G]. The wire pulls the fusing unit gear bracket [H] and the fusing unit drive is disengaged.

10.3 FUSING ENTRANCE GUIDE SHIFT MECHANISM



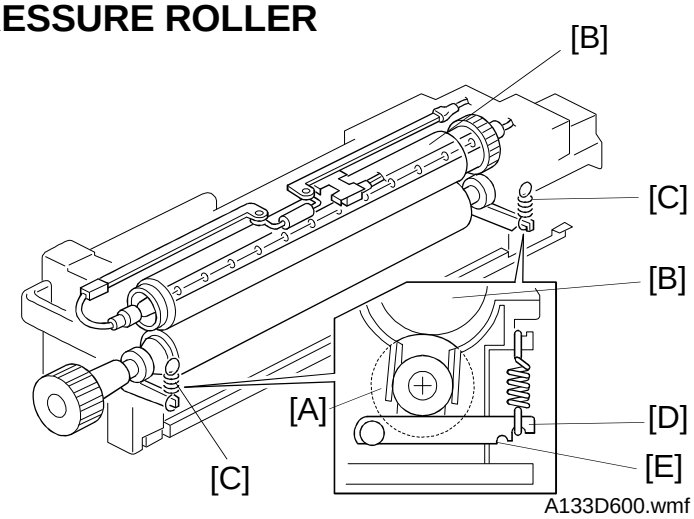
The entrance guide [A] for this machine has three holes on each side to adjust for thick or thin paper. Normally, the outer screw hole [B] on each side is used.

For thin paper, move the entrance guide up by securing it with screw holes [C]. This slightly lengthens the paper path which prevents the paper from creasing in the fusing unit.

For thick paper, move the entrance guide down (use the outer screw holes [B]). This is because the lower setting allows more direct access to the gap between the hot and pressure rollers. This prevents thick paper from buckling against the hot roller, which can cause blurring at the leading edge of the copy. Also, thick paper does not bend as easily, and is therefore less prone to creasing.

The inner screw holes [D] are spare in case the other screw holes get damaged.

10.4 PRESSURE ROLLER



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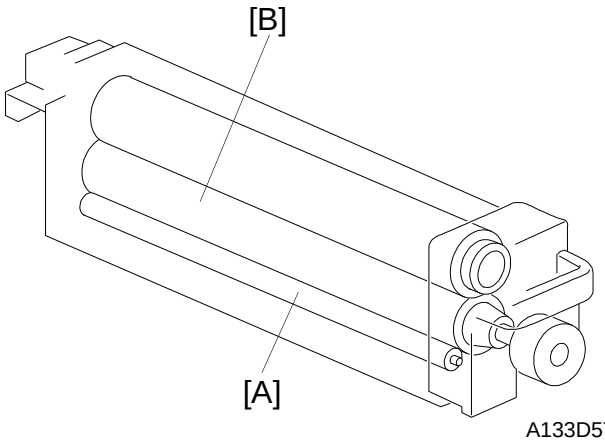
The pressure roller [A] is made of silicone rubber with a teflon tube coating. The pressure springs [C] constantly apply pressure between the hot roller [B] and the pressure roller.

The pressure can be changed by adjusting the position of the pressure springs. The upper position [D] is the normal setting. The lower position [E] increases the pressure and this prevents insufficient fusing by the fusing unit.

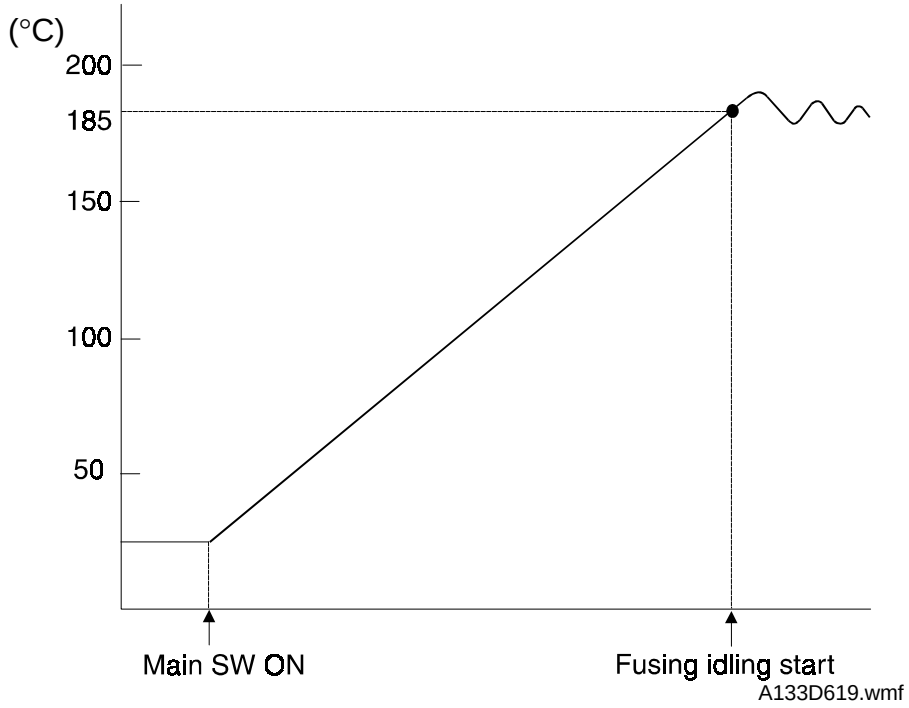
10.5 CLEANING MECHANISM



A133D575.wmf

The cleaning roller [A] is always in contact with the pressure roller [B]. It collects toner and paper dust adhering to the surface of the pressure roller. This is because the cleaning roller is made of metal and collects adhering matter more easily than the pressure roller (which has a teflon coating).

10.6 FUSING TEMPERATURE CONTROL



When the main switch turns on, the CPU checks the mains frequency for 500 ms; this is done in case phase control mode is selected later. Then the CPU turns on the fusing lamp.

After the main switch has been turned on, the copier starts fusing idling for about 30s when the thermistor detects the operating fusing temperature (185°C). When fusing idling mode is disabled, fusing idling is not done, regardless of the fusing temperature when the main switch is turned on.

Note: Fusing idling can be enabled or disabled with SP 1103. In this machine, it is normally disabled because the copy speed is not high enough to require it.

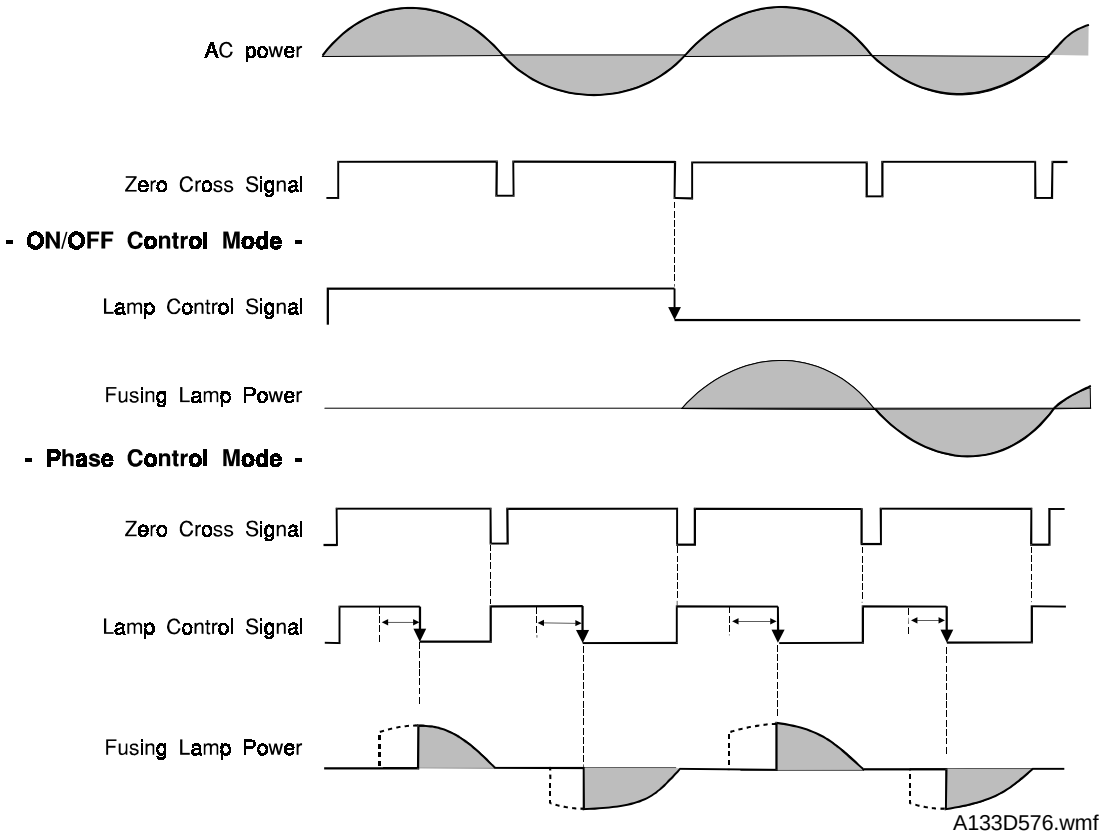
If the fusing lamp is turned on while the exposure lamp is on, the power supplied to the exposure lamp may fluctuate, possibly degrading the copy quality. To prevent this, in this machine, the fusing lamp can either stay off or change from on to off while the exposure lamp is on.

There are two types of fusing unit control: on/off control, and phase control. The mode can be selected with SP1104.

- On/Off Control -

When the thermistor detects the operation temperature, the fusing lamp is turned off. After that, the CPU keeps the operation temperature constant by turning the lamp on and off. This is the default setting.

- Phase Control Mode -



In on/off control mode, the ac drive board supplies full ac power to the fusing lamp.

In phase control mode, the fusing controller on the BCU board controls the lamp control signal duty cycle which in turn affects the duty cycle of the fusing lamp supply.

When the main switch is turned on, the BCU board starts to output the lamp control signal, which is generated from the zero cross signal.

The duty cycle of the lamp control signal depends on the temperature of the hot roller. When the hot roller temperature is low, the lamp control signal pulse will be wider to increase the temperature. Conversely, if the roller temperature is high, the duty cycles will be smaller to reduce the temperature.

Phase control mode should be selected only if the user has a problem with electrical noise on the same circuit or interference.

10.7 OVERHEAT PROTECTION

If the hot roller temperature reaches higher than 230°C, the CPU cuts off the power to the fusing lamp. At the same time, SC543 will be generated.

Even if the thermistor overheat protection fails, there is a thermofuse in series with the common ground line of the fusing lamp. If the temperature of the thermofuse reaches 169°C, the thermofuse opens, removing power from the fusing lamp. At the same time, the copier stops operating.

10.8 ENERGY SAVER FUNCTIONS

Note: This explanation is for the 230V machine. The energy saver function for the 115V machine is explained in section 12-2 (Energy Star) in more detail.

When the copier is not in use, the energy saver function reduces power consumption by decreasing the fusing temperature.

If the low power timer (UP mode) runs out, the copier automatically enters low power mode. The fusing lamp switches off until the lamp reaches the temperature selected with SP5920. The lower this temperature is, the longer the waiting time until the copier returns to the ready condition.

Also, when the Clear Modes/Low Power Mode key is held down for over 1 s, the copier goes into the low power mode. The Low Power indicator turns on and all the other indicators turn off.

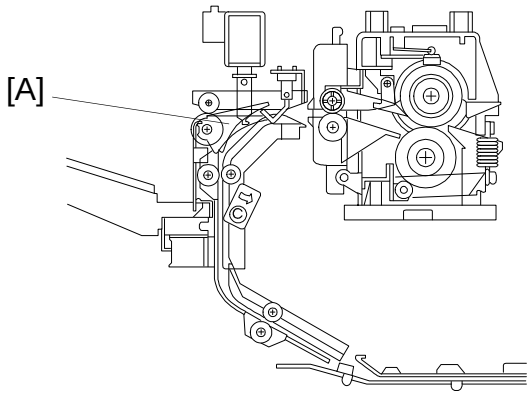
In low power mode, the copier returns to the ready condition if someone stands at the front of the copier (in other words, when the Auto Response sensor is activated).

The programming modes for this function are shown in the following table.

Mode	Method	Selectable values	Default	Unit/Step
Auto OFF Timer	This function only works in 115V models.			
Low Power Timer	UP mode	0 ~ 180 s	60 s	10 s
Fusing temp. in the low power mode	SP 5920	170 °C 155 °C 125 °C 100 °C	170 °C	
Duplex Mode Priority	UP mode	1 sided to 1 sided 1 sided to 2 sided 2 sided to 2 sided	1 sided to 1 sided	
Auto OFF Mode	SP 5303	This function only works in 115V models.		

11. DUPLEX

11.1 OVERVIEW



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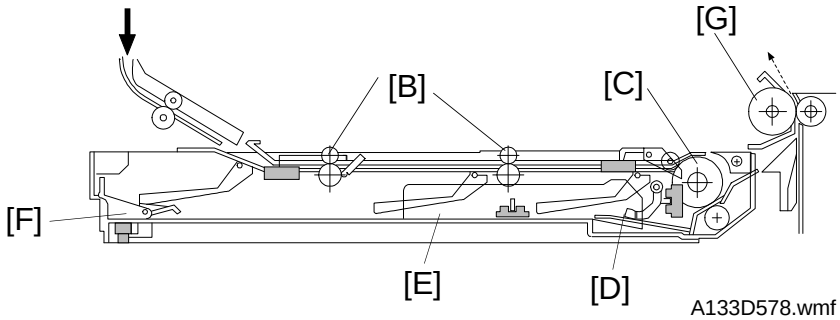

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The duplex tray is used for multiple two-sided and single two-sided copying.

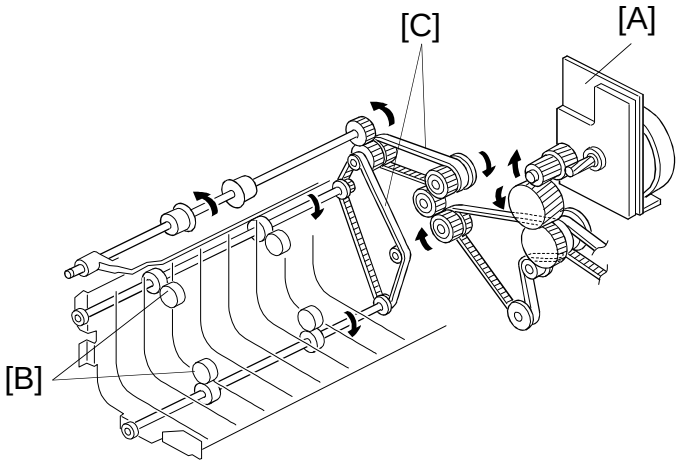
The junction gate [A] rotates up 1.1 seconds after the registration clutch turns on, and the copy passes to the duplex tray. Shortly after the fusing exit sensor detects the leading edge of the paper, the entrance rollers [B] and duplex feed roller [C] start to rotate. At the same time, the duplex bottom plate [D] lowers.

The copy feeds over the duplex feed roller and into the tray. The jogger fences [E] and end fence [F] move inward to square the copy stack, then they move back 10.5 mm from the paper stack. After the final copy is delivered to the stack area, the jogger and end fences remain against the paper stack.

Soon after the final copy is squared, the duplex bottom plate lifts to the paper feed position and the duplex feed roller starts rotating counterclockwise to feed the top copy to the relay rollers [G]. The second side is then copied with the copy following the paper tray feed station paper path.

For a diagram of the paper feed path, see "Paper Path - Duplex Copying" in the Overall Machine Information section.

11.2 DRIVE MECHANISM



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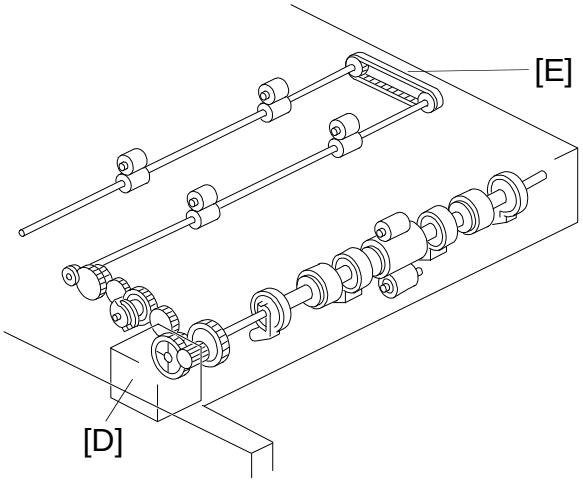

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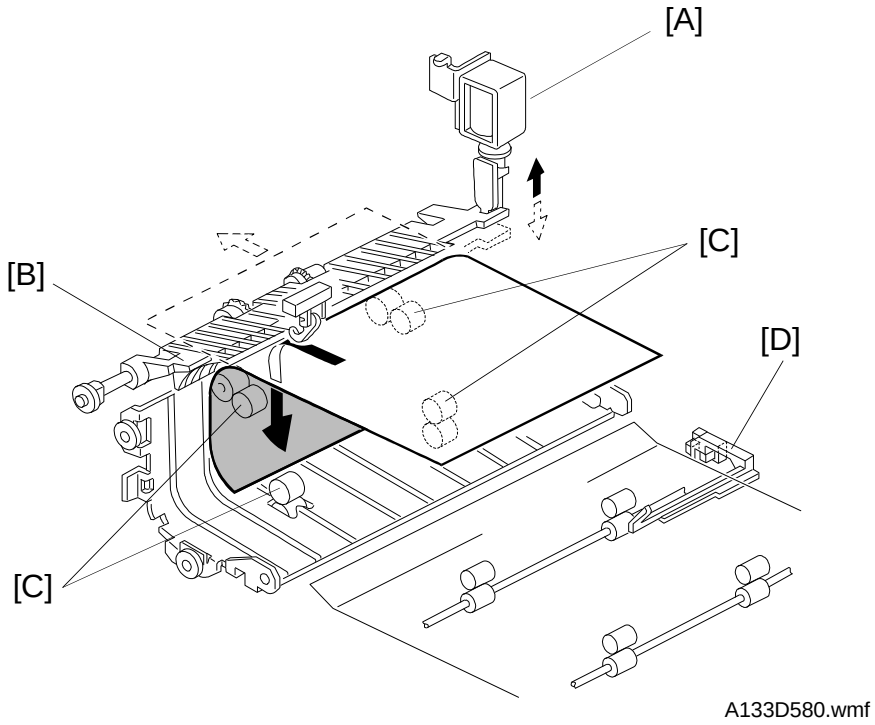
The main motor [A] drives the transport rollers [B] through the timing belts [C]. All rollers in the duplex tray are driven by the duplex feed motor [D] through a series of gears and a timing belt [E]. Helical gears are used to reduce noise.

The duplex feed motor also drives the duplex bottom plate up and down.

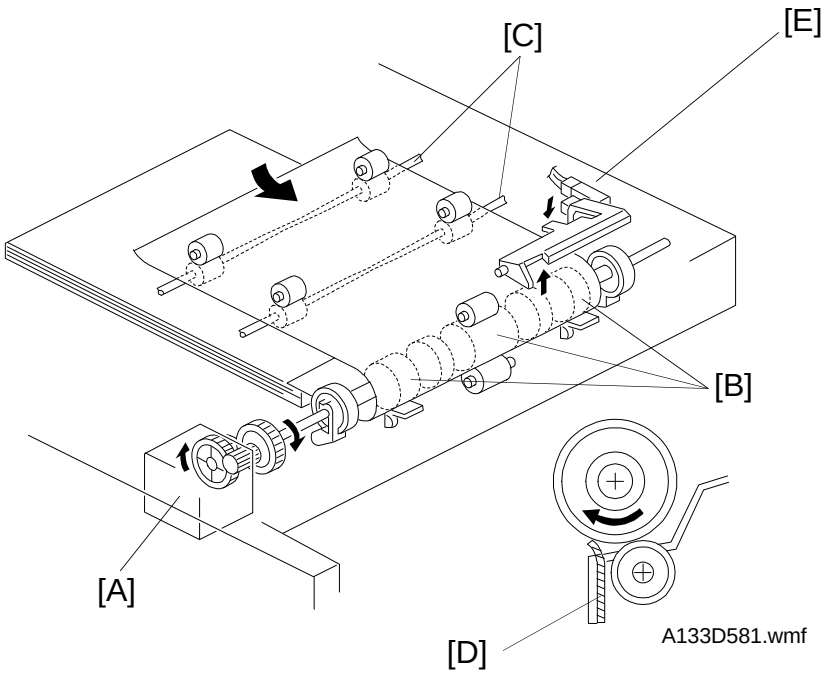
11.3 TURN GUIDE



The junction gate solenoid [A] is energized 1.1 seconds after the registration clutch has been turned on. Then, the junction gate [B] rotates upwards to direct the copy paper to the duplex turn guide. The junction gate solenoid stays on until the first side copies are stacked in the duplex tray.

The copy is then directed out of the duplex tray back into the copier by the transport rollers [C] to start the second side copying. There is a duplex entrance sensor [D] for paper misfeed detection.

11.4 DUPLEX ENTRANCE TO DUPLEX TRAY

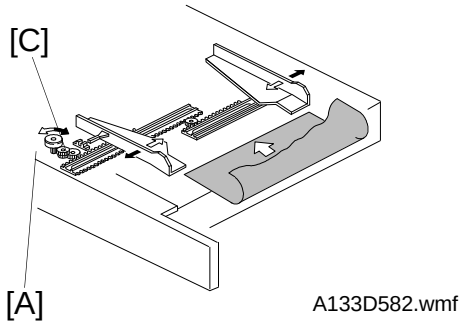


The duplex feed motor [A] starts turning 500 ms after the leading edge of the paper activates the fusing exit sensor. This motor drives the duplex feed rollers [B] and the duplex transport rollers [C]. The copy paper from the turn guide is directed to the duplex tray through these rollers.

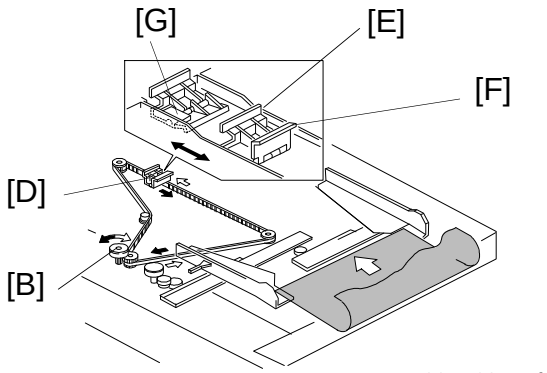
The tip of the flip mylar [D] moves to the left (front view) when the duplex feed rollers rotate to feed the copy into the duplex tray. The mylar presses the copy against the duplex feed rollers, ensuring that the trailing edge of the copy clears the guide plate.

The duplex turn sensor [E] detects the trailing edge of the paper as it enters the tray.

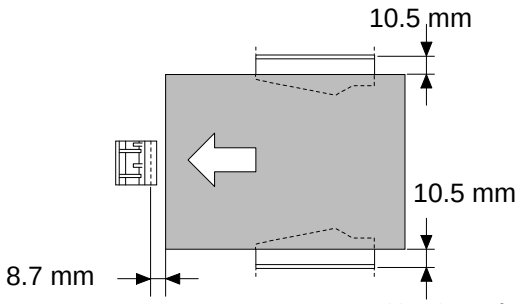
11.5 DUPLEX STACKING



A133D582.wmf



A133D583.wmf



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There are two motors for driving the fences. The side jogger fences are driven by the side fence jogger motor [A]. The end jogger fence is driven by the end fence jogger motor [B]. Using two separate motors for the side and end fences allows the duplex tray to handle all paper sizes from A3/11" x 17" to A5/ 8 1/2" x 5 1/2" sideways.

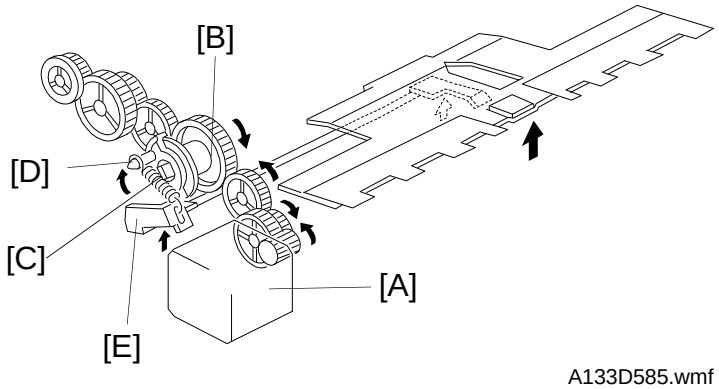
There are two home position sensors. One is for the jogger fences [C], and the other is for the end fence [D]. When the main switch turns on, the side fence jogger motor and the end fence jogger motor rotate to place the jogger fences and the end fence at their home positions.

When the registration clutch turns on, the side fences move 10.5 mm, and the end fence moves 8.7 mm away from the selected paper size. Then, when the copy paper is delivered to the duplex tray, the jogger fences move inward to square the paper after the duplex turn sensor detects the trailing edge of the copy paper. (The duplex turn sensor is [E] in the diagram on the previous page.) Shortly after this, the jogger fences move back to their previous positions. After the last copy of the first side copy run enters the duplex tray, the jogger fences remain against the paper stack.

There are two end fences. One [E] is for A3/11 x 17" size paper. The other [F] is for sizes smaller than B4. They are included as a unit. When A3/11 x 17" size paper is in the duplex tray, the end fence unit moves to the left (as seen from the operation side of the machine) and the B4 end fence rotates down as it is pressed against the end fence stopper [G].

11.6 PAPER FEED FROM THE DUPLEX TRAY

11.6.1 Tray Lift Mechanism



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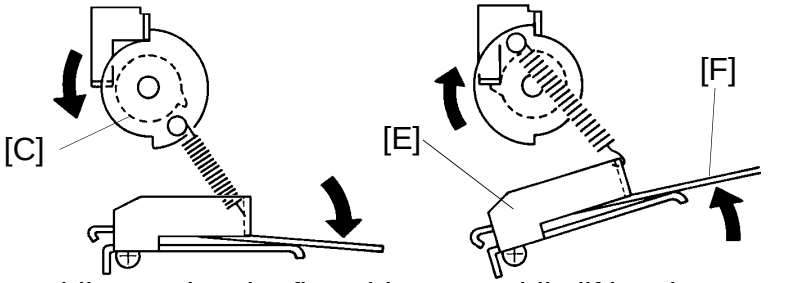


- While copying the first side - - While lifting the tray -

A133D586.img

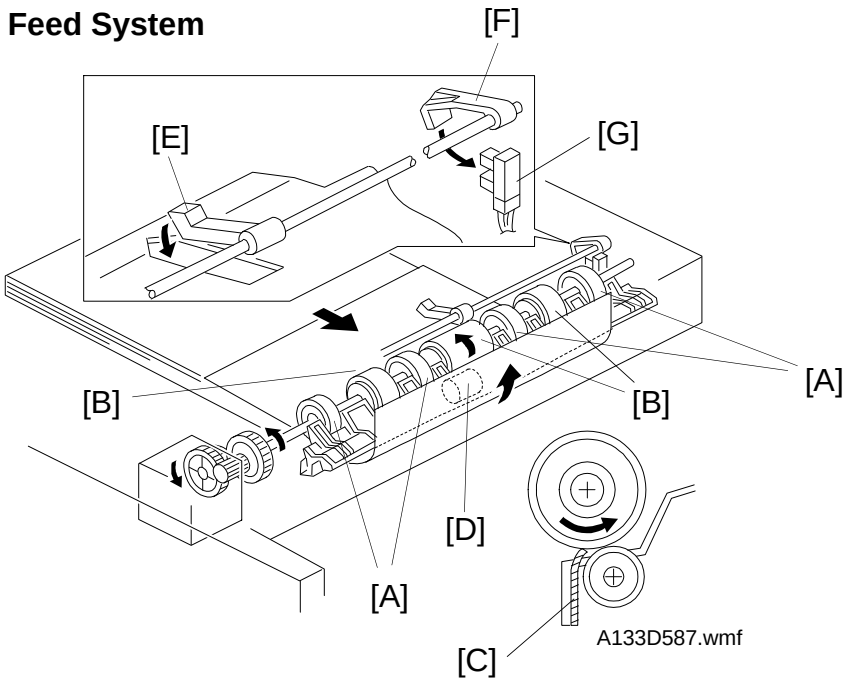
After the first side copies have been made, the duplex feed motor [A] changes direction, and the cam clutch gear [B] lifts up the duplex bottom plate through a series of gears.

While the first side is being copied, the duplex feed motor is rotating clockwise and the cam clutch gear is rotating counter clockwise (see the above drawing).

When all copies have been stacked in the duplex tray, the duplex feed motor rotates counterclockwise, and the cam clutch gear rotates clockwise. The cam clutch [C] also rotates clockwise because of the spring inside the clutch. The pin [D] on the clutch lifts up the duplex lift lever [E] through a spring, raising the duplex bottom plate [F].

When the duplex feed motor rotates clockwise again, the cam clutch rotates counterclockwise, and the bottom plate lowers.

11.6.2 Paper Feed System



While paper is being stacked in the duplex tray, the paper flatteners [A] correct curl at the leading edge of the paper.

After all the paper has been stacked in the duplex tray, the jogger fences square the paper stack and the duplex feed motor rotates counterclockwise briefly to prepare to feed the paper from the duplex tray. At this time, the bottom plate rises and the duplex feed rollers [B] move the flip mylars [C] back to the right (front view).

The duplex paper feed system consists of three sets of duplex feed rollers and a friction roller [D]. As the friction roller has a one-way bearing inside, it rotates freely during paper stacking and locks during paper feeding. The duplex feed rollers can feed only the top sheet of the stack because the friction roller functions in the same way as a friction pad does.

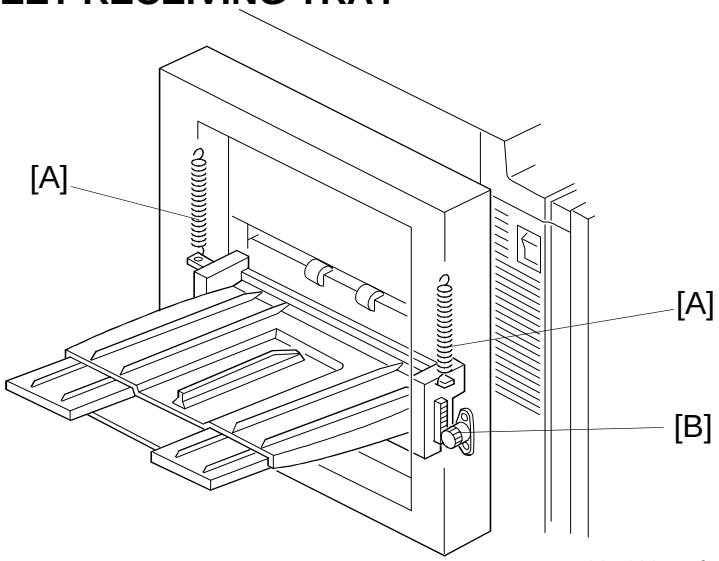
After that, the paper leaving the duplex tray for copying the second side follows the paper tray feed station paper path.

After the duplex tray runs out the final copy, the paper end feeler [E] drops through a slot in the duplex bottom plate. The duplex paper end actuator [F], which is on the same shaft as the duplex paper end feeler, pivots into the duplex paper end sensor [G]. The sensor sends the signal to the cpu to stop the next paper feed cycle.

For a diagram of the paper feed path, see "Paper Path - Duplex Copying" in the Overall Machine Information section.

12. OTHERS

12.1 500-SHEET RECEIVING TRAY



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The 500-sheet receiving tray is available as an option.

The tray holder is suspended by springs [A]. After about 200 copies (A4/LT) have been stacked on the tray, the copy tray starts to move down because of the paper weight.

The tray holder has a rack gear that contacts the damper gear [B]. When copies are taken from the tray, the springs pull the tray back up. However, the damper gear resists the upward pull of the springs and the tray rises slowly.

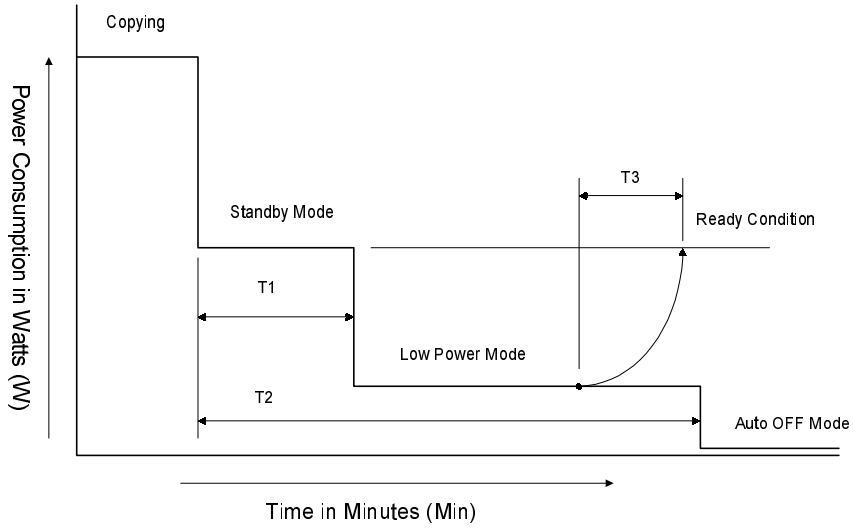
12.2 ENERGY STAR

12.2.1 Overview

This Energy Star specifications set by the USA Environmental Protection Agency (EPA - Tier 2) are effected only for the 115V machine. This machine has the following three modes: Low Power Mode, Auto OFF mode, and Duplex Default Mode. Details are as follows.

12.2.2 Low Power Mode

When the copier is not in use, the energy saver function reduces power consumption by decreasing the fusing temperature. If the low power timer (set using UP mode) runs out, the copier automatically enters the low power mode. The fusing lamp switches off until the fusing unit reaches the temperature selected with SP5920. The lower this temperature is, the longer the wating time until the copier returns to the ready condition.



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T1: Low Power Mode Timer (UP mode)
Default = 15 minutes
Adjustment range = 1 ~ 120 minutes

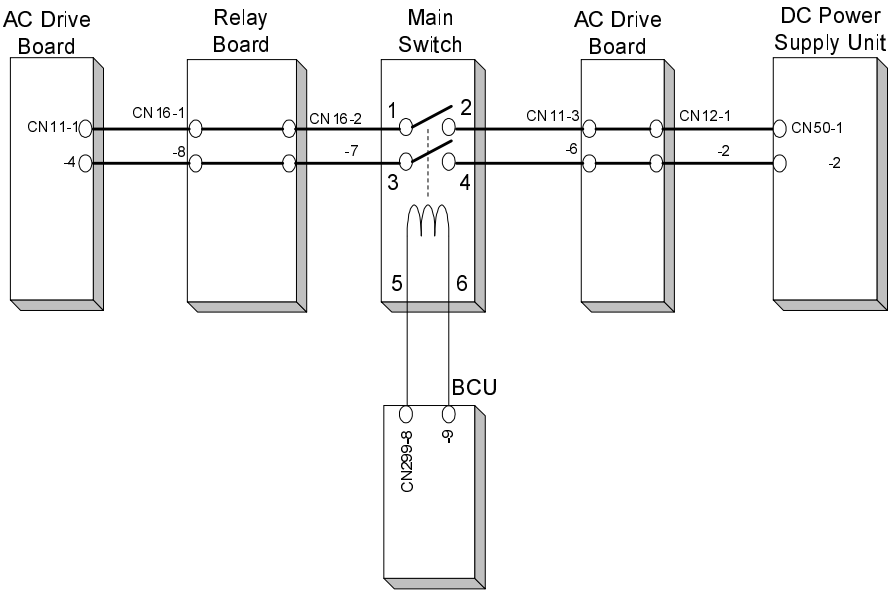
T2: Auto OFF Timer (UP mode)
Default = 60 minutes
Adjustment range = 10 ~ 120 minutes

T3: Recovery Time: 30 s or less

12.2.3 Auto OFF Mode

When the Auto OFF timer expires (the default is 60 minutes), the machine cuts all power to the copier. The Auto OFF timer can be programmed with UP mode. The power is re-supplied when the main switch is turned back on. The longer the machine has been off, the longer it will take to return to a ready condition.

To automatically turn off the machine, a new type of main switch with an incorporated coil is used. When the CPU drops CN299-9 from +24 to 0, the main switch contacts are opened. The wiring diagram and connector layout are shown below.



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12.2.4 Programming Modes

The following table shows the programming modes for the energy star function.

Mode	Method	Selectable values	Default	Unit/Step
Auto OFF Timer	UP mode	10 ~ 120 min	60 min	10 min
Low Power Timer	UP mode	1 ~ 120 min	15 min	1 min
Fusing temp. in the low power mode	SP 5920	125 °C 100 °C	125 °C	
Duplex Mode Priority	UP mode	1 sided to 1 sided 1 sided to 2 sided 2 sided to 2 sided	1 sided to 2 sided	
Auto OFF Mode (see Note)	SP 5303	Enabled Disabled	Enabled	

NOTE: The auto off mode should be disabled for all countries except for the USA. This is because the Enegy Star specifications are required only for the USA. If this mode is disabled, the selectable values for the auto off timer will be changed to "0 ~ 120 min". The auto off function is disabled if "0 min" is selected.

SECTION 3

INSTALLATION PROCEDURE

1. INSTALLATION REQUIREMENTS

1.1 ENVIRONMENT

1. Temperature Range: 10°C ~ 30°C
2. Humidity Range: 15% ~ 90%
3. Ambient Illumination: Less than 1,500 lux (Do not expose to direct sunlight.)
4. Ventilation: 30 m^3/hr/person
5. Ambient Dust: Less than 0.10 mg/m^3 (2.7 x 10^{-6} oz/yd^3)
6. If the place of installation is air-conditioned or heated, place the machine:
   a) where it will not be subjected to sudden temperature changes.
   b) where it will not be directly exposed to cool air from an air conditioner.
   c) where it will not be directly exposed to heat from a heater.
7. Do not place the machine where it will be exposed to corrosive gases.
8. Do not install the machine at any location over 2,000 m (6,500 feet) above sea level.
9. Place the copier on a strong and level base.
10. Do not place the machine where it may be subjected to strong vibration.

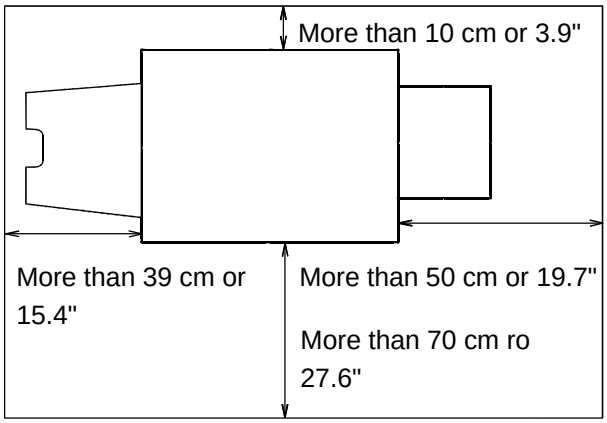
1.2 MACHINE LEVEL

1. Front to back: Within 5 mm (0.2") of level
2. Right to Left: Within 5 mm (0.2") of level

1.3 MINIMUM SPACE REQUIREMENTS

Place the copier near a power source, providing clearance as shown.

– Copier –



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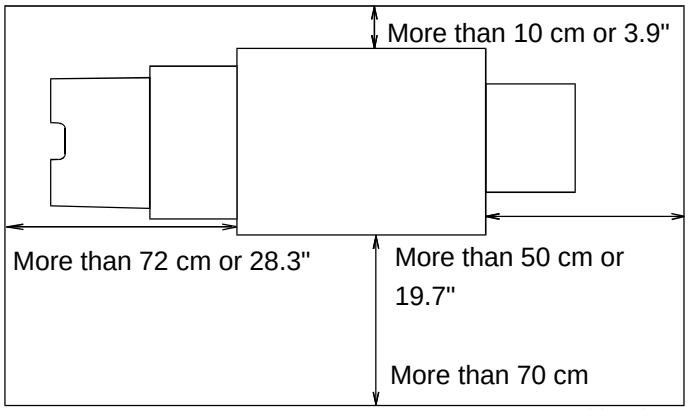
– Copier with the optional finisher–



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1.4 POWER REQUIRMENTS

⚠ CAUTION

A. Be sure to ground the machine.
B. Make sure the plug is firmly inserted in the outlet.
C. Avoid multi-wiring.

1. Input voltage level:
   120V, 60Hz: More than 12A
   220V ~ 240V, 50 Hz/60Hz: More than 7A

2. Permissible voltage fluctuation: ±10%

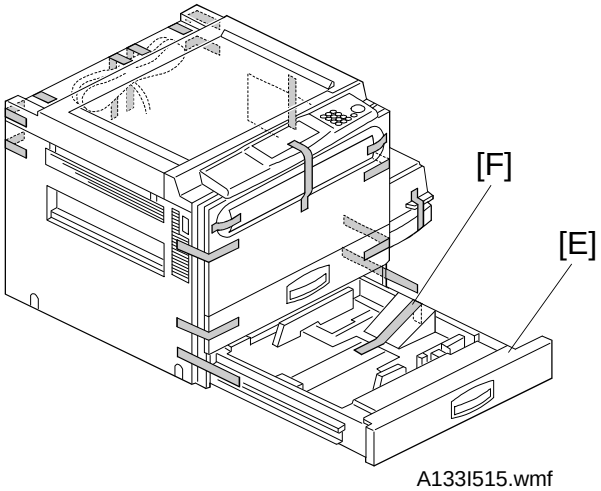
3. Do not set anything on the power cord.

2. COPIER INSTALLATION

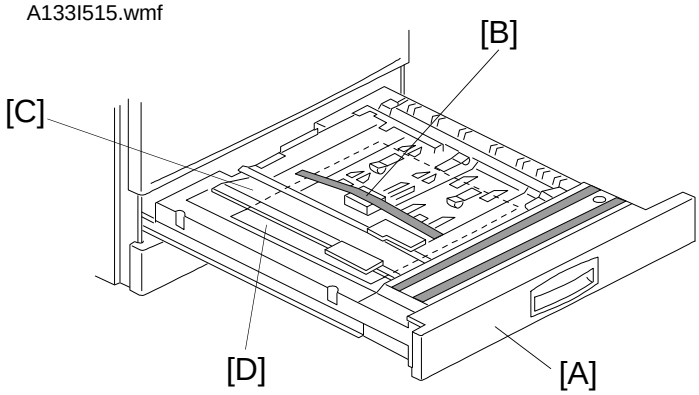
2.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:

Description	Qt'y
1. Paper Size Decal	1
2. Operating Instructions (except for -27 machines)	1
3. New Equipment Condition Report	1
4. User Survey Card (-17 machines only)	1



A133I515.wmf

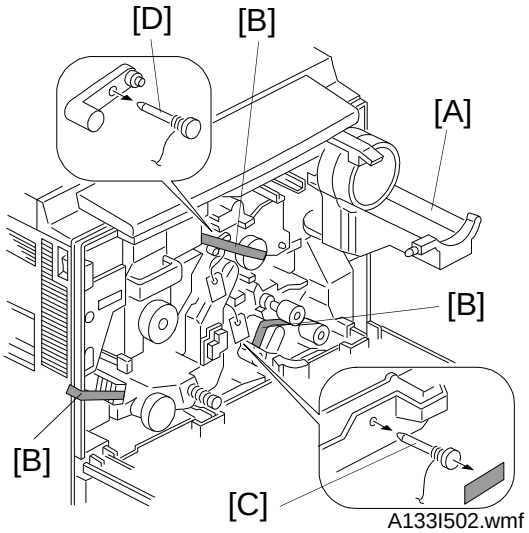


A133I501.wmf

NOTE: 1) Keep the shipping retainers after installing the machine. They will be reused if the machine is moved to another location in the future.

2) Never lift the machine by holding the LCT, or the LCT will break.

1. Remove the strips of tape.
2. Pull out the duplex tray [A] and remove the strips of tape.
3. Remove the guide roller stopper [B].
4. Open the lower duplex guide plate [C] and remove the sheet of paper [D].
5. Install the duplex tray in the machine.
6. Pull out the paper tray [E], and remove the strips of tape and the bottom plate stopper [F]. Then install the paper tray in the machine.



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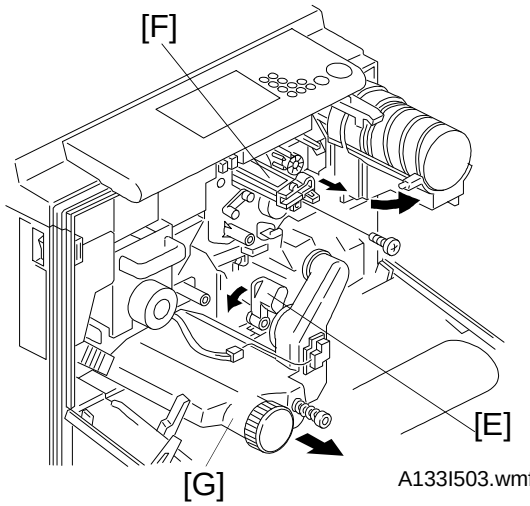

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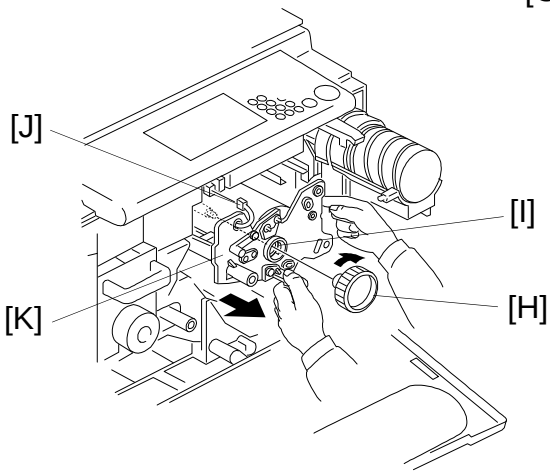
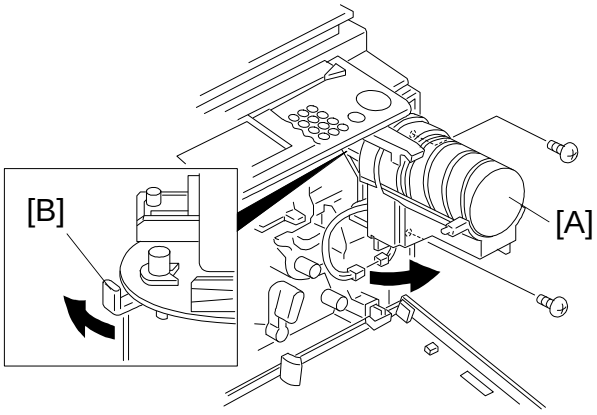


A133I504.wmf

7. Open the front cover and swing out the toner bottle holder [A].
8. Remove the strips of tape [B].
9. Remove transfer belt release pin [C] and cleaning blade release pin [D].

   NOTE: Put back pins [C] and [D] before transporting the machine to a new location.
10. Turn the "A1" lever [E] counterclockwise to lower the transfer belt unit.
11. Remove the charge corona unit [F] (1 screw).
12. Remove the toner collection bottle [G] (1 connector).
13. Remove the drum knob [H] and drum bushing [I].
14. Disconnect the ID sensor harness [J] and carefully slide out the drum unit [K] until the front guide plate releases from the positioning pins.
15. Move the development unit to the right so that the development unit is away from the drum, then slide out the drum unit completely.



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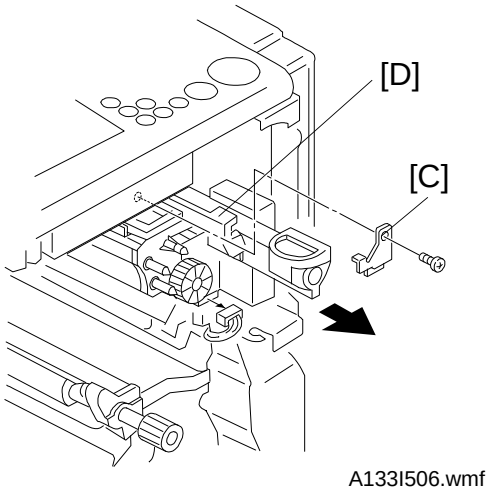

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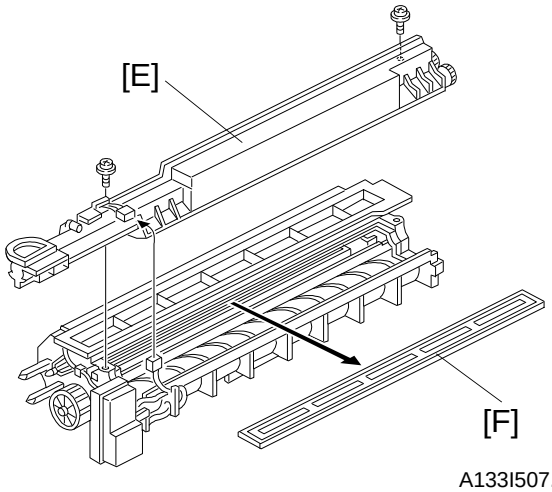
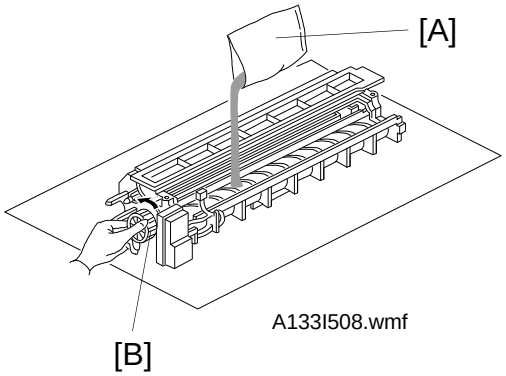


A133I507.wmf

16. Remove the toner bottle holder [A] (2 screws, 1 connector).
17. Turn the shutter lever [B] of the toner bottle holder as shown.
18. Remove the development unit stopper [C] (1 screw).
19. Pull out the development unit [D] (1 connector). Then place it on a clean sheet of paper.
20. Remove the toner supply unit [E] (2 screws, 1 connector).
21. Remove the development filter [F].



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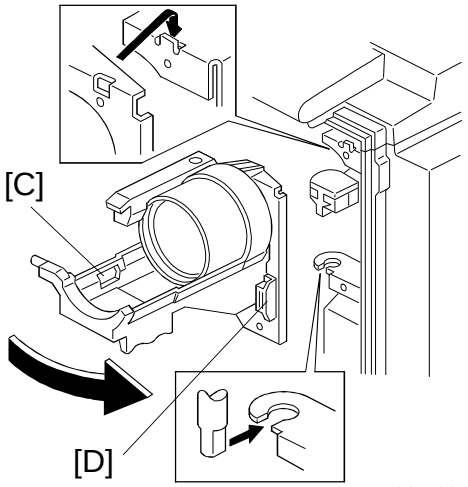


A133I522.wmf

22. Pour about half a pack of developer [A] into the development unit. Then rotate the knob [B] as shown to distribute the developer evenly. Then pour in all the remaining developer and rotate the knob again.

    NOTE: To prevent the developer from spilling, do not rotate the knob in the other direction.

23. Attach the toner supply unit to the development unit.

24. Install the development unit in the copier and put back the stopper ([C] that was removed in step 18).

    NOTE: Be careful not to damage the bias wire.

25. Move the development unit to the right so that the development unit is away from the drum. Then install the drum unit.

26. Make sure that the toner bottle holder [C] and the toner bottle holder bracket [D] are at right angles as shown above. If not, swing the toner bottle holder out in the direction of the big arrow in the diagram.

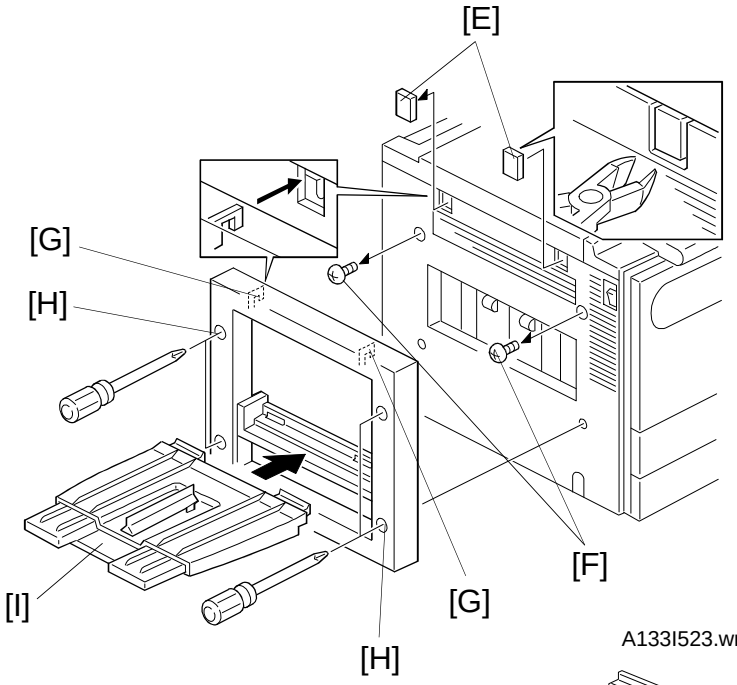
27. Install the toner bottle holder.

28. Install the charge corona unit.

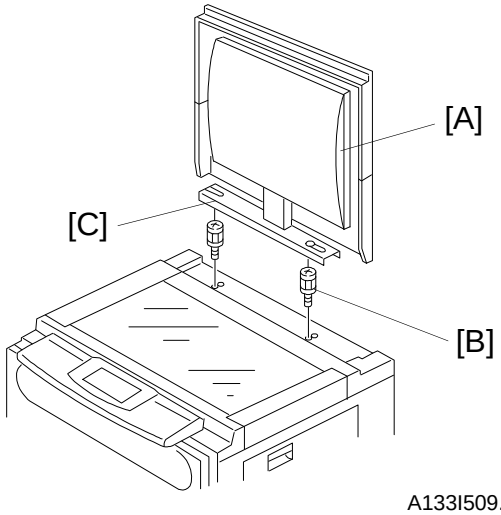
29. Install the toner collection bottle.

30. Install the toner bottle by following the instructions on the reverse side of the front cover.

31. Swing the toner bottle holder into its original position and close the front cover.

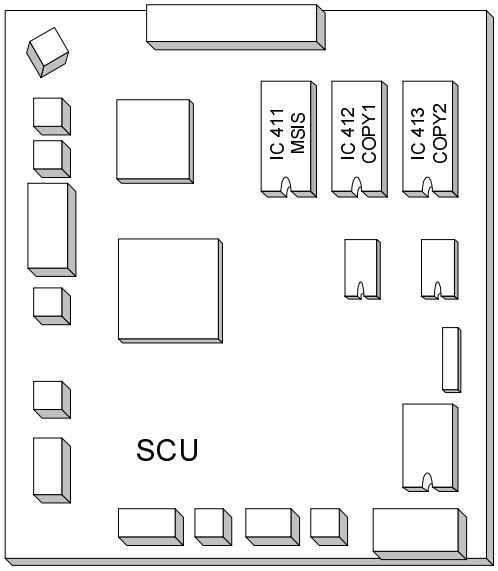


A133I523.wmf



A133I509.wmf

32. Install the 500-sheet copy tray if required:
    1) Remove caps [E] with nippers.
    2) First, remove the screws [F], and fit the hooks [G] on the copy tray unit into the openings. Then tighten the screws [H] that are built into the copy tray unit.
    3) Install the copy tray [I].
33. Install the optional platen cover [A] as shown if required:
    1) Install two stud screws [B] on the top cover.
    2) Position the platen cover bracket [C] on the stud screws and slide it to the left.



A133i516.wmf

Steps 34 through 36 are for the 220 ~ 240 V machine only.

34. Remove the rear cover.

35. Install the three ROMs which contain the language kit in the IC411, IC412, and IC413 sockets on the SCU board (the lower left PCB as viewed from the rear of the machine).
    The "MSIS" ROM should be put in the IC411 socket.
    The "COPY1" ROM should be put in the IC412 socket.
    The "COPY2" ROM should be put in the IC413 socket.

    NOTE: Do not bend the pins of the ROMs.
    Do not install the ROMs the wrong way round.

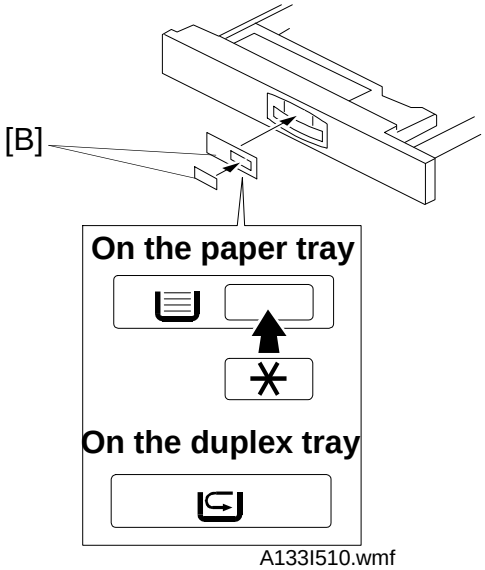
36. Put the rear cover back on the machine.

37. Plug in the copier and turn on the main switch.

38. After the machine reaches the operation condition (the start button LED is green), enter SP mode as follows:
    1) Press the "Clear Modes" key.
    2) Enter "107" using the numeric keys.
    3) Hold down the "Clear/Stop" key for more than 3 seconds.

39. Perform the TD sensor initial setting as follows:
    1) Enter "2801" and press the "Enter" key.
    2) Touch "Start" on the LCD.

    NOTE: The machine will automatically stop when TD sensor initial setting is completed.



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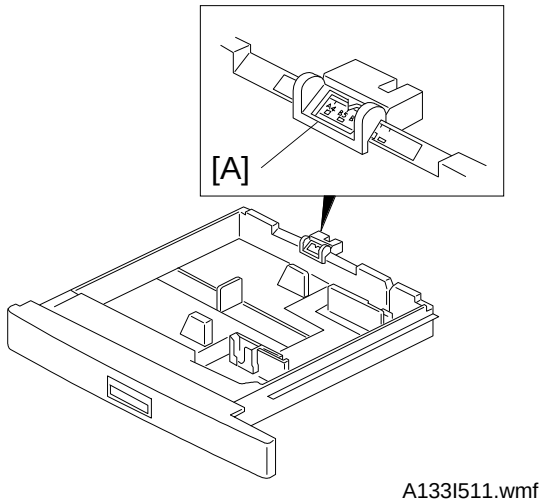


A133I511.wmf

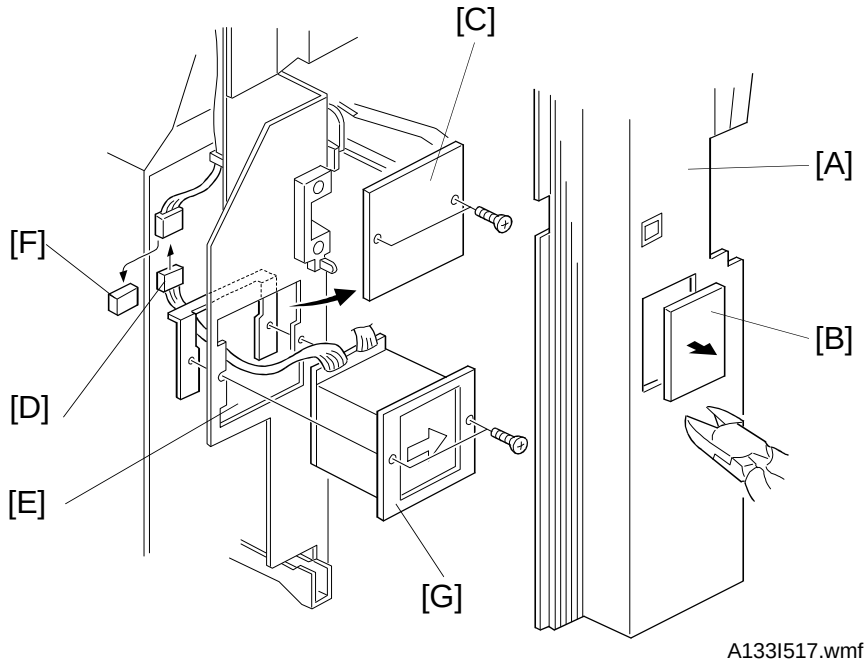
40. Perform the free run procedure as follows:
    1) Enter "5802" and press the "Enter" key.
    2) Touch "ON" on the LCD then touch "Copy Mode" on the LCD.
    3) Set the number of copies at 50.
    4) Close the platen cover or the ADF then press the "Start" key.
    5) After finishing the free run, touch "SP Mode" on the LCD.
    6) Touch "Quit" on the LCD to leave SP mode.
41. Pull out the paper tray and load paper into it (the paper size and orientation should be as specified by the customer).

    NOTE: The side and rear fences should be properly positioned.
42. Select the appropriate paper size for the paper tray by sliding the paper size slider [A] into the correct position.

    NOTE: A non-standard paper size can be selected with a UP mode (See the Paper Size Selection section).
43. **When the optional Paper Feed Unit is installed:** Enter the proper paper size for each paper tray using a UP mode. (See the Paper Size Selection section.)
44. Attach the appropriate paper size decals [B] to the paper trays. Also, attach the duplex decal to the duplex tray.

    NOTE: Paper size decals are also used for the optional paper feed unit. Keep any remaining decals for use with the paper feed unit.
45. Check the copy quality and machine operation.

2.2 KEY COUNTER (OPTION)

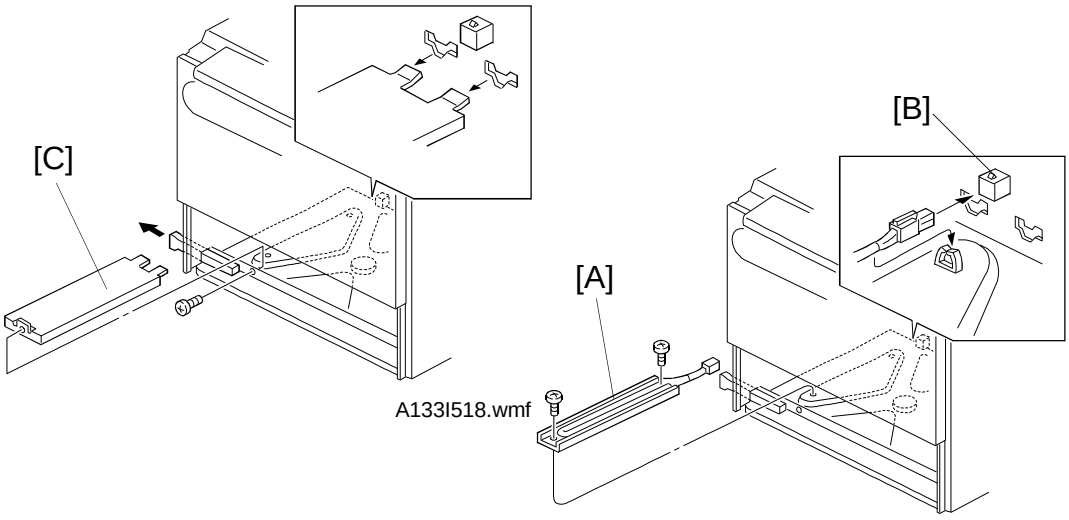


⚠ CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove the right cover [A]. (See "Replacement and Adjustment - Outer Cover Removal".)
2. Remove the cap [B] with nippers.
3. Remove the key counter cover [C] (2 screws)
4. Pass the key counter holder connector [D] through the opening [E].
5. Disconnect the connector [F] and connect the key counter holder connector.
6. Mount the key counter holder [G] (2 screws).
7. Reassemble the machine and check the key counter's operation.

2.3 TRAY HEATER (OPTION)



A133I518.wmf

A133I519.wmf

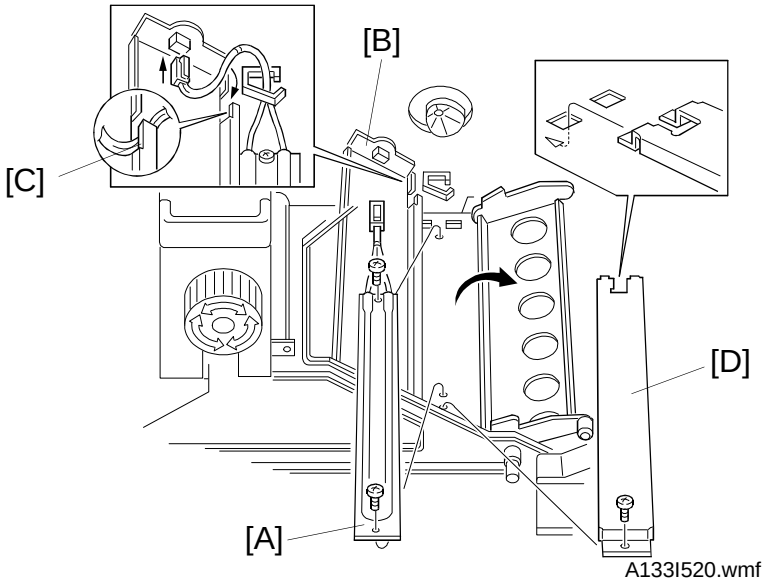
⚠ CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove the duplex unit. (See "Replacement and Adjustment - Duplex Unit Removal".)
2. Remove the paper feed tray. (See "Replacement and Adjustment - Paper Feed Tray Removal".)
3. Install the tray heater [A] (2 screws).
4. Connect the connector of the heater to the copier's connector [B] which is mounted on the rear frame.
5. Fit the heater harness into the clamper.
6. Install the heater cover [C] (1 screw).
7. Reassemble the machine.
8. Check the printer side-to-side registration for the 1st paper feed station (SP1002-2) and the duplex unit (SP1002-1).

   NOTE: Tell the customer that even when the copier's main switch is turned off, the copier power cord should be plugged in. Otherwise, the tray heater will not function.

2.4 DRUM HEATER (OPTION)



⚠ CAUTION

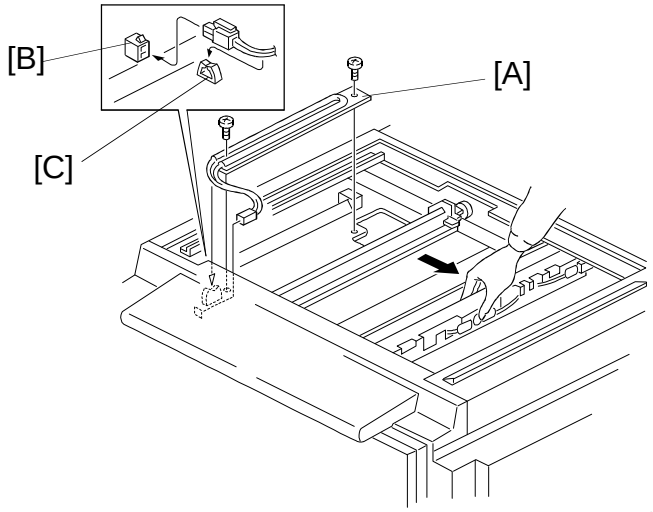
Unplug the copier power cord before starting the following procedure.

1. Remove the transfer the belt unit. (See "Replacement and Adjustment - Transfer Belt Unit Removal".)
2. Move the "A1" lever clockwise.
3. Install the drum heater [A] (2 screws).
4. Connect the connector of the heater to the copier's connector [B] which is mounted on the rear frame.
5. Fit the heater harness into the clamper.

   NOTE: Route the heater harness under the hook [C].
6. Install the heater cover [D] (1 screw).
7. Reassemble the machine.

   NOTE: Tell the customer that even when the copier's main switch is turned off, the copier power cord should be plugged in. Otherwise, the drum heater will not function.

2.5 OPTICS ANTI-CONDENSATION HEATER (OPTION)



A133I521.wmf

⚠ CAUTION

Unplug the copier power cord before starting the following procedure.

1. Remove the exposure glass. (See "Replacement and Adjustment - Exposure Glass Removal".)
2. Move the 1st scanner to the center of the scanner unit.
3. Install the optics anti-condensation heater [A] (2 scwers).
4. Connect the connector of the heater to the copier's connector [B] which is mounted on the front frame of the scanner unit.
5. Fit the harness into the clamper [C].
6. Reassemble the machine.

NOTE: Tell the customer that even when the copier's main switch is turned off, the copier power cord should be plugged in. Otherwise, the optics anti-condensation heater will not function.

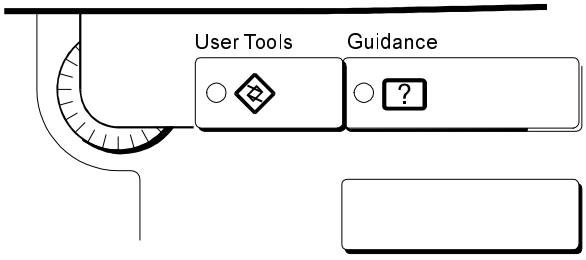
3. PAPER SIZE SELECTION

3.1 OPTIONAL PAPER FEED UNIT

The paper size for the paper feed unit can be selected with User Program mode.

You can select paper of the following sizes:

Metric version	Inch version
A3 ▭, B4 ▭, A4 ▯ ▭, B5 ▯ ▭ 11" x 17" ▭, 8 1/2" x 14" ▭, 8 1/2" x 11" ▯ ▭, 8" x 10"▭, 8" x 13" ▭, 8 1/2" x 13" ▭, 8 1/4" x 13" ▭	11" x 17" ▭, 8 1/2" x 14" ▭, 8 1/2" x 11" ▯ ▭, 11" x 15" ▭, 10" x 14" ▭, 8" x 10 1/2" ▭, 8" x 10" ▭, A3 ▭, B4 ▭, A4 ▯ ▭, 8" x 13" ▭, 8 1/2" x 13" ▭, 8 1/4" x 13" ▭



A133I512.wmf

1. Press the User Tools key.
2. Touch the Basic Settings key.
3. Touch the Next key three times to reach the paper size setting menu.
4. Find the paper tray (2, 3, or 4) and touch the Change key. Select the new paper size by touching a key. Then touch the Exit key.
5. Press the User Tools key.

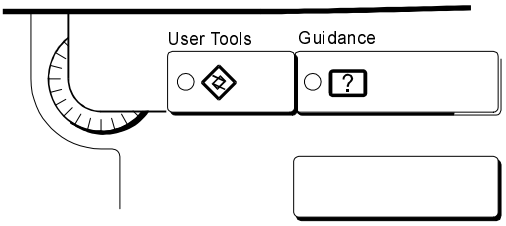
3.2 1ST TRAY - NON-STANDARD PAPER SIZE SELECTION

For the 1st tray, a wider range of paper sizes can be selected with User Program mode.

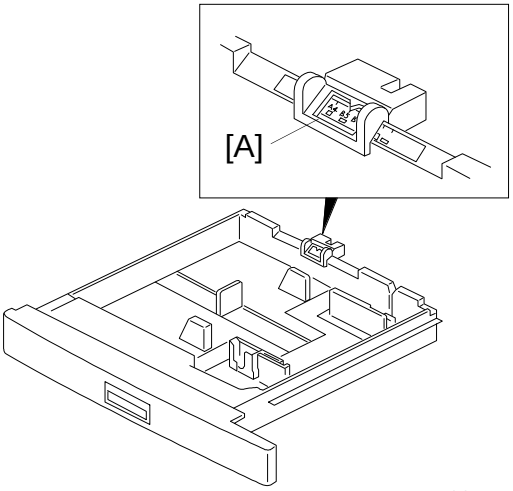
If a non-standard paper size is selected, the machine ignores the paper size set with the paper size slider.

You can select paper of the following sizes:

Metric version	Inch version
11" x 17" ▭ , 8 1/2" x 14" ▭ , 5 1/2" ▭ x 8 1/2" ▯ , 8" x 10" ▭	11" x 15" ▭ , 10" x 14" ▭ , 8" x 10 1/2" ▭ , 8" x 10" ▭ , B4 ▭



A133I512-2.wmf



A133I511-2.wmf

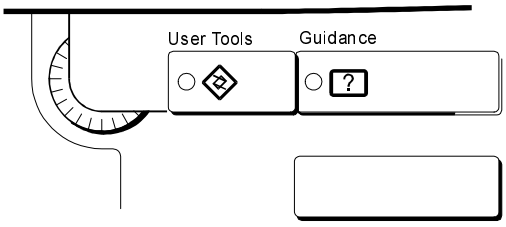
1. Slide the paper size slider [A] on the paper tray into the "*" position.
2. Press the User Tools key.
3. Touch the Basic Setting key.
4. Touch the Next key three times to reach the paper setting menu.
5. In the Tray <*> Paper Size Setting menu, the present size setting is displayed. Touch the Change key. Select the new paper size by touching a key. Then, touch the Exit key.
6. Press the User Tools key.

3.3 1ST TRAY - F/F4 SIZE PAPER SELECTION

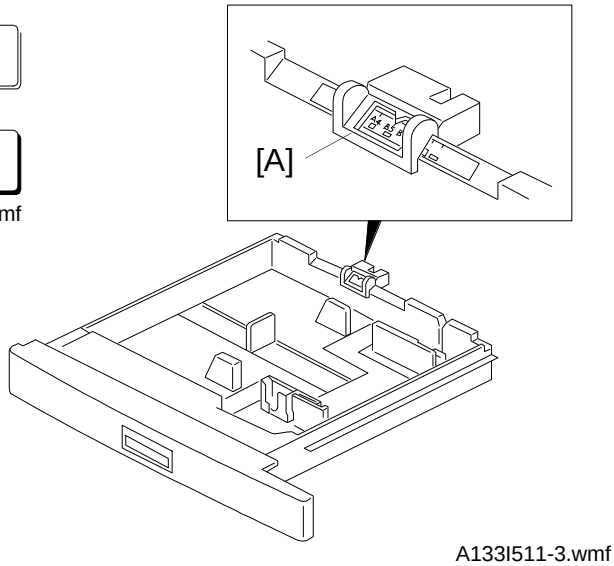
For the 1st tray, a wider range of F and F4 paper sizes can be selected with User Program mode.

You can select paper of the following sizes:

8" x 13"
8 1/4" x 13"
8 1/2" x 13"



A133I512-3.wmf



A133I511-3.wmf

1. Slide the paper size slider [A] on the paper tray into the "F/F4" position.
2. Press the User Tools key.
3. Touch the Basic Setting key.
4. Touch the Next key three times to reach the paper setting menu.
5. In the Tray <F/F4> Paper Size Setting menu, the present size setting is displayed. Touch the Change key. Select the new paper size by touching a key. Then, touch the Exit key.
6. Press the User Tools key.

SECTION 4

SERVICE TABLES

1. SERVICE REMARKS

1.1 GENERAL CAUTION

Do not turn off the main switch while any of the electrical components are active. Doing so might cause damage to units such as the transfer belt, drum, and development unit when they are pulled out of or put back into the copier.

1.2 DRUM

The organic photoconductor (OPC) drum is more sensitive to light and ammonia gas than a selenium drum. Follow the cautions below when handling an OPC drum.

1. Never expose the drum to direct sunlight.
2. Never expose the drum to direct light of more than 1,000 Lux for more than a minute.
3. Never touch the drum surface with bare hands. When the drum surface is touched with a finger or becomes dirty, wipe it with a dry cloth or clean it with wet cotton. Wipe with a dry cloth after cleaning with wet cotton.
4. Never use alcohol to clean the drum; alcohol dissolves the drum surface.
5. Store the drum in a cool, dry place away from heat.
6. Take care not to scratch the drum as the drum layer is thin and is easily damaged.
7. Never expose the drum to corrosive gases such as ammonia gas.
8. Always keep the drum in the protective sheet when keeping the drum unit, or the drum itself, out of the copier. Doing so avoids exposing it to bright light or direct sunlight. This will protect the drum from light fatigue.
9. Before pulling out the drum unit, place a sheet of paper under the drum to catch any spilt toner.
10. Dispose of used drums in accordance with local regulations.

11. When installing a **new** drum in the drum unit, the following must be done.
    a) Remove the protective sheet after securing the new drum to the drum unit.
    b) Do the ID Sensor Initial Setting procedure (SP Test Mode 3001).

12. When installing the drum unit, the following steps must be performed in the order written.
    1) Secure the drum unit to the shaft with the knob screw.
    2) Set the drum stay in position.

1.3 TRANSFER BELT UNIT

1. Replace the transfer belt every two PM cycles (240K copies) to avoid bad effects on the drum.
2. Never touch the transfer belt surface with bare hands.
3. Take care not to scratch the transfer belt as the surface is easily damaged.
4. Before installing the new transfer belt, clean all the rollers with a dry cloth to prevent the belt from slipping.

1.4 SCANNER UNIT

1. When installing the exposure glass, make sure that the white reference plate is facing down.
2. Clean the exposure glass with alcohol or glass cleaner to reduce the amount of static electricity on the glass surface.
3. Use a cotton pad with water or a blower brush to clean the mirrors and lens.
4. Do not bend or crease the exposure lamp flat cable.
5. Do not disassemble the lens unit. Doing so will throw the lens and the copy image out of focus.
6. Do not turn any of the CCD positioning screws. Doing so will throw the CCD out of position.

1.5 LASER UNIT

1. Do not loosen the screws that secure the LD drive board to the laser diode casing. Doing so would throw the LD unit out of adjustment.
2. Do not adjust the variable resistors on the LD unit, as they are adjusted in the factory.
3. The polygon mirror and F-theta lenses are very sensitive to dust. Never open the optical housing unit or remove the polygon mirror motor cover.
4. Do not touch the glass surface of the polygon mirror motor unit with bare hands.

1.6 CHARGE CORONA UNIT

1. Clean the charge corona wire with a dry cloth. Do not use sandpaper or a solvent.
2. Clean the charge corona casing with wet cotton and a dry cloth.
3. Clean the end blocks with a blower brush first to remove toner and paper dust. Then clean it with a dry cloth if any toner still remains on it.
4. Do not touch the corona wires with bare hands. Oil stains from fingers may cause uneven image density on copies.
5. Make sure that there is no foreign material (iron filings, etc.) on the casing.
6. To avoid uneven charge, do not bend or scratch the wire surface when installing new corona wires. Also be sure that the corona wires are correctly positioned in the grooves of the end blocks.
7. Clean the charge grid plate with a blower brush, water, then with a dry cloth. When doing so, be careful not to damage the grids by letting fibers attach to them.
8. Do not touch the charge grid plate with bare hands. Also, do not bend the charge grid plate or make any dent in it. Doing so may cause uneven charge.

1.7 DEVELOPMENT

1. Be careful not to nick or scratch the development rollers.
2. Place the development unit on a sheet of paper after removing it from the copier.

3. Never disassemble the development roller assembly. The position of the doctor plate is set with special tools and instruments at the factory to ensure the proper gap between the doctor blade and the development roller.
4. Clean the drive gears after removing used developer.
5. Dispose of used developer in accordance with local regulations.
6. When removing or installing the development unit, be careful not to damage the drum surface with the entrance seal on the development unit.
7. Never load different types of developer and toner into the development unit. Doing so will cause poor copy quality and toner scattering.
8. Immediately after installing new developer, the TD sensor initial setting procedure should be performed to avoid damage to the copier. Do not perform the TD sensor initial setting with used developer. Do not make any copies before doing the TD sensor initial setting.
9. When using a vacuum cleaner to clean the development unit casing, always ground the casing with your fingers to avoid damaging the toner density sensor with static electricity.
10. After replacing the TD sensor, do the TD sensor initial setting procedure (SP 2801).

1.8 DRUM CLEANING

1. Do not touch the cleaning brush with bare hands.
2. When servicing the cleaning section, be careful not to damage the edge of the cleaning blade.

1.9 FUSING UNIT

1. After installing the fusing thermistor, make sure that it is in contact with the hot roller and that it is movable.
2. Be careful not to damage the edges of the hot roller strippers or their tension springs.
3. Do not touch the fusing lamp and rollers with bare hands.
4. Make sure that the fusing lamp is positioned correctly and that it does not touch the inner surface of the hot roller.

1.10 PAPER FEED

1. Do not touch the surface of the pick-up, feed, and separation rollers.
2. The side fences and end fence of the paper tray must be positioned correctly to align with the actual paper size to avoid paper misfeeds.

1.11 USED TONER

1. The used toner tank should be emptied at every PM cycle, but we recommend checking the amount of used toner in the tank at every EM.
2. When reinstalling the used toner tank, make sure that the toner overflow sensor connector is inserted firmly.
3. Dispose of used toner in accordance with local regulations. Never throw toner into an open flame, for toner dust may ignite when exposed to open flame.

1.12 OTHERS

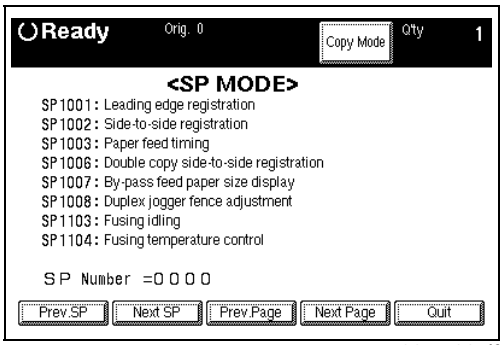
1. When carrying the copier, never lift it up by holding the LCT. Otherwise, the LCT will be broken. Hold the copier by the carrier handles in the bottom corners.
2. Do not move the copier while the main switch is on. The hard disk will be damaged. Stop the hard disk from spinning with SP 4911-4 before moving the machine.

2. SERVICE PROGRAM MODE

2.1 SERVICE PROGRAM MODE OPERATION

The service program (SP) mode is used to check electrical data, change modes, and adjust values.

2.1.1 Service Program Access Procedure



A133M502.tif

1) How to enter the SP mode

Press the following keys in sequence.

[Clear Modes] → [1] → [0] → [7] → [C/⊘]

Hold the [C/⊘] key for more than 3 seconds.

A menu of SP modes is displayed on the screen.

2) How to use an SP mode

Input the required SP mode number at the ten-key pad, then press Enter (#).

Also, you can scroll through the modes on the screen by pressing the "Prev. SP" or "Next SP" button.

To get to a Class 2 level, press the Enter key again. Then scroll through the Class 2 modes with "Prev. SP" or "Next SP".

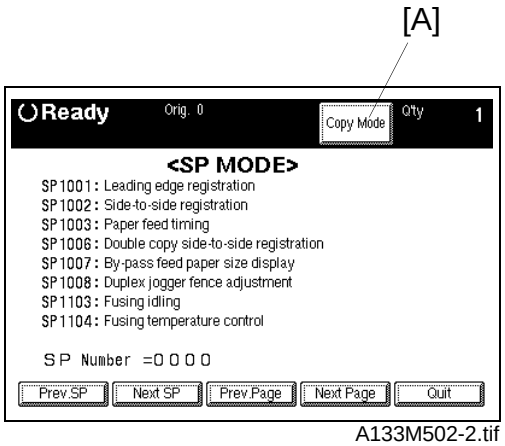
3) How to return to the main menu from within an SP mode

Press the [Clear Modes] key.

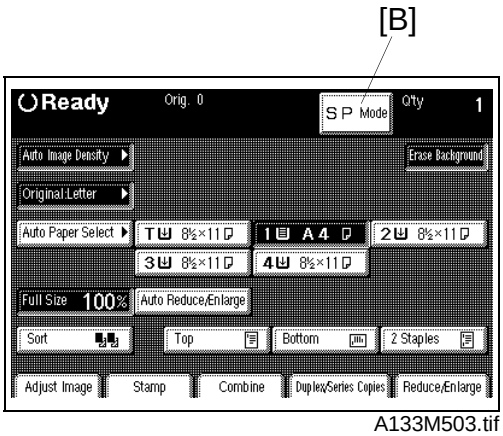
4) How to leave SP mode

Touch the "Quit" button on the display.

2.1.2 Accessing Copy Mode from within an SP Mode



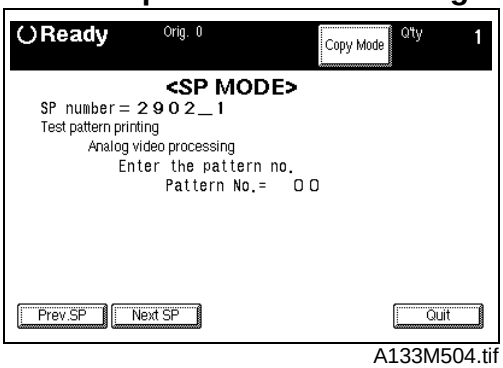
A133M502-2.tif



A133M503.tif

1. Touch "Copy Mode" [A] on the display. (This now changes to "SP Mode".)
2. Select the appropriate copy modes and make trial copies.
3. To return to the SP mode, touch "SP Mode" [B] on the display.

2.1.3 To Input a Value or Setting for an SP Mode



A133M504.tif

1. Input the value using the number keys, or for some SP modes, press the appropriate setting button on the screen.
2. If you used the number keys, now press the "Enter" key.

   NOTE: If you forget to press the "Enter" key, the previous value remains.

Service Tables

2.2 SERVICE PROGRAM MODE TABLES

2.2.1 MAIN SP MODE TABLE

NOTE: 1. In the Function column, comments are in italics.
2. In the Settings column, the default value is in bold letters.
3. An asterisk " * " after the mode number means that this mode is stored in the NVRAM. If you do a RAM reset, all these SP modes will be reset to their factory settings.

Mode No.			Function	Settings
Class 1	Class 2			
1001 *		Leading Edge Registration	Adjusts the printing leading edge registration using Trimming Area Pattern (SP2902-3, No.10).	+9 ~ -9 0.1 mm/step **+ 0.0 mm**
			Use the •/∗ key to toggle between + and -. The specification is 3 ±2 mm. See "Replacement and Adjustment - Copy Image Adjustments" for details.	
1002 *	1 *	Side-to-Side Registration (Duplex)	Adjusts the printing side-to-side registration from the duplex tray using the Trimming Area Pattern (SP2902-3, No.10).	+9 ~ -9 0.1 mm/step **+ 0.0 mm**
			Use the •/∗ key to toggle between + and -. The specification is 2 ±1.5 mm. See "Replacement and Adjustment - Copy Image Adjustments" for details on SP1002	
	2 *	Side-to-Side Registration (1st paper feed)	Adjusts the printing side-to-side registration from the 1st paper feed station using the Trimming Area Pattern (SP2902-3, No.10).	+9 ~ -9 0.1 mm/step **+ 0.0 mm**
			Use the •/∗ key to toggle between + and -. The specification is 2 ±1.5 mm.	
	3 *	Side-to-Side Registration (2nd paper feed: Option PFU tray 1)	Adjusts the printing side-to-side registration from the 2nd paper feed station using the Trimming Area Pattern (SP2902-3, No.10).	+9 ~ -9 0.1 mm/step **+ 0.0 mm**
			Use the •/∗ key to toggle between + and -. The specification is 2 ±1.5 mm.	
	4 *	Side-to-Side Registration (3rd paper feed: Option PFU tray 2)	Adjusts the printing side-to-side registration from the 3rd paper feed station using the Trimming Area Pattern (SP2902-3, No.10).	+9 ~ -9 0.1 mm/step **+ 0.0 mm**
			Use the •/∗ key to toggle between + and -. The specification is 2 ±1.5 mm.	
	5 *	Side-to-Side Registration (4th paper feed: Option PFU tray 3 if present)	Adjusts the printing side-to-side registration from the 4th paper feed station using the Trimming Area Pattern (SP2902-3, No.10).	+9 ~ -9 0.1 mm/step **+ 0.0 mm**
			Use the •/∗ key to toggle between + and -. The specification is 2 ±1.5 mm.	

Mode No.			Function	Settings
Class 1	Class 2			
1002 *	6 *	Side-to-Side Registration (By-pass feed)	Adjusts the printing side-to-side registration from the by-pass feed table using the Trimming Area Pattern (SP2902-3, No.10). *Use the •/∗ key to toggle between + and -. The specification is 2 ±1.5 mm.*	+9 ~ -9 0.1 mm/step **+ 0.0 mm**
	7 *	Side-to-Side Registration (LCT)	Adjusts the printing side-to-side registration from the LCT using the Trimming Area Pattern (SP2902-3, No.10). *Use the •/∗ key to toggle between + and -. The specification is 2 ±1.5 mm.*	+9 ~ -9 0.1 mm/step **+ 0.0 mm**
1003 *	1 *	Paper Feed Timing (Paper Feed Trays)	Adjusts the relay clutch timing at registration. The relay clutch timing determines the amount of paper buckle at registration. (A +ve setting leads to more buckling.)	+9 ~ -9 1 mm/step **+ 0 mm**
	2 *	Paper Feed Timing (By-pass, LCT)		
1006 *		Double copy side-to-side registration	Adjusts the image position from the center line in double copy mode. *Use the •/∗ key to toggle between + and -. See "Replacement and Adjustment - Copy Image Adjustments" for details.*	+9 ~ -9 1 mm/step **+ 0 mm**
1007 *		By-pass Feed Paper Size Display	Displays the paper width sensor data for the by-pass feed table.	
1008 *	1 *	Duplex Jogger Fence Adjustment (Side Fence)	Adjusts the stop position of the side jogger fence span of the duplex unit. *Use the •/∗ key to toggle between + and -.*	*+4 ~ -4* *0.5 mm/step* **+ 0.0 mm**
	2 *	Duplex Jogger Fence Adjustment (End Fence)	Adjusts the stop position of the end jogger fence span of the duplex unit. *Use the •/∗ key to toggle between + and -.*	*+4 ~ -4* *0.5 mm/step* **+ 0.0 mm**
1103 *		Fusing Idling	Selects whether fusing idling is done or not. *Normally disabled in this machine. However, if fusing is incomplete on the 1st and 2nd copies, switch it on. This may occur if the room is cold.*	On **Off**
1104 *		Fusing Temperature Control	Selects the fusing temperature control mode.	**On/Off** Phase
1105 *		Fusing Temperature Adjustment	Adjusts the fusing temperature.	170 ~ 200 *1°C/step* **185°C**

Service Tables

Mode No.			Function	Settings
Class 1	Class 2			
1106		Fusing Temperature Display	Displays the fusing temperature.	
2001 *	1 *	Grid Voltage Adjustment (For copying)	Adjusts the voltage applied to the grid plate during copying.	600 ~ 1000 1 V/step **890 V**
			Do not adjust.	
	2 *	Grid Voltage Adjustment (For ID sensor pattern)	Adjusts the voltage applied to the grid plate when making the ID sensor pattern.	600 ~ 1000 1 V/step **650 V**
			Do not adjust.	
	5 *	Charge Corona Current Adjustment	Adjusts the current applied to the charge corona wire.	900 ~ 1300 1 μA/step **1100 μA**
			Do not adjust.	
2101 *	1 *	Leading Edge Erase Margin (Printing)	Adjusts the leading edge erase margin.	0.0 ~ 9.0 0.1 mm/step **3.0 mm**
			The specification is 3 ±2 mm. See "Replacement and Adjustment - Copy Image Adjustments" for details on SP2101.	
	2 *	Trailing Edge Erase Margin (Printing)	Adjusts the trailing edge erase margin.	0.0 ~ 9.0 0.1 mm/step **2.0 mm**
			The specification is 2 ±2 mm.	
	3 *	Left Side Edge Erase Margin (Printing)	Adjusts the left side erase margin.	0.0 ~ 9.0 0.1 mm/step **2.0 mm**
			The specification is 2 ±1.5 mm.	
	4 *	Right Side Edge Erase Margin (Printing)	Adjusts the right side erase margin.	0.0 ~ 9.0 0.1 mm/step **1.0 mm**
			The specification is $2^{+2.5}_{-1.5}$ *mm.*	
2103 *		LD Power Adjustment	Adjusts the LD power.	-127 ~ +127 2.1 μW/step **+0**
			Do not change the value.	
2201 *	1 *	Development Bias Adjustment (for copying)	Adjusts the development bias during copying.	200 ~ 700 1 V/step **550 V**
			This can be adjusted as a temporary measure if faint copies appear due to an ageing drum.	
	2 *	Development Bias Adjustment (for ID sensor pattern)	Adjusts the development bias when making the ID sensor pattern.	200 ~ 700 1 V/step **310 V**
			This can be adjusted as a temporary measure if faint copies appear due to an ageing drum.	

Mode No.			Function	Settings
Class 1	Class 2			
2207		Forced Toner Supply	Forces the toner bottle to supply toner to the toner supply unit for 30 seconds.	
			Toner supply finishes automatically after 30 seconds. This process is not normally needed in the field for this model. At installation, doing the 50-page free run also supplies toner to the development unit.	
2208 *	1 *	Toner Supply Mode	Selects the toner supply mode.	**Detect** Fixed
			Use fixed supply mode only as a temporary measure if process control is not working.	
	2 *	Toner Supply Ratio (Fixed Supply Mode)	Selects the toner supply ratio for Fixed Supply Mode.	**6%** 15% 30%
			Use a higher value if the user tends to make lots of copies that have a high proportion of black.	
2209 *		Toner Supply Rate (Detect Supply Mode)	Adjusts the toner supply rate for Detect Supply Mode.	50 ~ 200 1 mg/s / step **116 mg/s**
			Increasing this value reduces the toner supply clutch on time. Use a lower value if the user tends to make lots of copies that have a high proportion of black.	
2210 *		ID Detection Interval	Changes the interval for making the ID sensor pattern (V_{SP}/V_{SG} detection).	10 ~ 200 1 copy/step **200 copies**
			Reducing the interval will also reduce the CPM. *Do not adjust this.*	
2220 *		V_{TREF} Manual Setting	Adjust the V_{TREF} of the TD sensor.	1.50 ~ 3.00 0.01V/step **2.52V**
			Change this value after replacing the development unit with another one that already contains toner. *For example, when using a development unit from another machine for test purposes, do the following:* *1. Check the value of SP2220 in both the machine containing the test unit and the machine that you are going to move it to.* *2. Install the test development unit, then input the V_{TREF} for this unit into SP2220.* *3. After the test, put back the old development unit, and change SP2220 back to the original value.*	
2223 *		V_T Display	Displays the TD sensor output voltage.	

Service Tables

Mode No.			Function	Settings
Class 1	Class 2			
2301 *	1 *	Transfer Current Adjustment (1st side of the paper)	Adjusts the current applied to the transfer belt during copying on the 1st side of the paper.	10 ~ 60 1 μA/step **32 μA**
			If the user uses thicker paper, the current may have to be increased to ensure sufficient transfer of toner.	
	2 *	Transfer Current Adjustment (2nd side of the paper)	Adjusts the current applied to the transfer belt during copying on the 2nd side of the paper.	10 ~ 60 1 μA/step **32 μA**
			See above.	
	6 *	Transfer Current Adjustment (By-pass Feed)	Adjusts the current applied to the transfer belt during copying from the by-pass feed table.	10 ~ 60 1 μA/step **48 μA**
			See above; note that thicker paper can be fed from the bypass feed tray, so the factory setting is higher.	
2801		TD Sensor Initial Setting	Performs the TD sensor initial setting. This SP mode controls the voltage applied to the TD sensor to make the TD sensor output about 2.5 V.	
			Use this mode only after installing the machine, changing the TD sensor, or the adding new developer.	
2803		Forced Charge Corona Wire Cleaning	Forces the charge corona wire cleaning motor to start cleaning.	
			This only works if the optional wire cleaning motor is installed.	
2804 *	1 *	Charge Corona Wire Cleaning Enable/Disable	Determines whether to clean the charge corona wire every time interval set with SP 2804-2.	
			This only works if the optional wire cleaning motor is installed.	
	2 *	Charge Corona Wire Cleaning Interval	Changes the interval for charge corona wire cleaning.	100 ~ 10000 100 copies/step **2500 copies**
			This only works if the optional wire cleaning motor is installed.	

Mode No.			Function	Settings
Class 1	Class 2			
2902	1	Test Pattern Printing (Analog Video Processing)	Prints the test patterns for analog video processing. See section 2.2.2 for how to print test patterns. 0. Not used 1. 16 gradations 2. 128-dot intervals 3. 64-dot intervals	
			This SP mode is useful for finding whether the SBU or EX-IPU failed. If the printout is OK, the SBU is defective. If the printout is not OK, the EX-IPU is defective.	
	2	Test Pattern Printing (Digital Video Processing)	Prints the test patterns for digital video processing. See section 2.2.2 for how to print test patterns. 0. Not used 1. Vertical Stripes 2. Grayscales 3. Cross Pattern 4. Black Bands	
			This SP mode is useful for finding whether the printer or the EX-IPU failed. If the printout is OK, the EX-IPU is defective. If the printout is not OK, the printer is defective.	
	3	Test Pattern Printing (Printing)	Prints the printer test patterns. See section 2.2.2 for how to print test patterns. Example: 10. Trimming Area For the other test patterns, refer to section 2.2.2.	
			This SP mode is useful for finding the part that failed. If the printout is OK, the EX-IPU is defective. If the printout is not OK, the printer is defective.	
	6	Test Pattern Printing (Image Memory)	Prints the test pattern for the memory unit. See section 2.2.2 for how to print test patterns. 0. Not used 1. Horizontal Stripes	
			If the printout is no good, the image memory is defective.	
2905 *		LD PWM Laser Pulse Positioning	Selects the laser pulse positioning type that is used for test printouts and when in binary picture processing mode.	**2: Center** 3. Left 4. Right 5. Concentrated
			If SP 4904-1 is set to NO, this SP mode is ignored. The "center" setting will be used.	
2906 *		TD Sensor Input Voltage	Use to input the TD sensor control voltage.	4 ~ 10 0.1 V/step **8.0 V**
			Factory use only	
2909 *		Main Scan Magnification	Adjusts the magnification in the main scan direction for the printer.	- 2.54 ~ + 2.54 0.02 %/step **+ 0.00 %**
			Use the •/∗ key to toggle between + and -. See "Replacement and Adjustment - Copy Image Adjustments" for details.	
2950 *		Side-to-Side Registration (Base)	Changes the printing start position.	- 12.7 ~ + 12.7 0.1 mm/step **+ 0.0 mm**
			Factory use only	
3001		ID Sensor Initial Setting	Performs the ID sensor initial setting. The ID sensor output for the bare area of the drum (V_{SG}) is adjusted to 4.0 ± 0.2V.	
			This SP mode should be performed after replacing or cleaning the ID sensor or replacing the drum.	

Service Tables

Mode No.			Function	Settings
Class 1	Class 2			
3103 *		ID Sensor Output Display	Displays the current VSG and VSP output. *If the ID sensor does not detect the ID pattern, "VSP=5.0v/VSG=5.0v" is displayed. If the ID sensor does not detect the bare area of the drum, "VSP=0.0v/VSG=0.0v" is displayed.*	VSP=■.■■V VSG=■.■■V
4008 *		Sub Scan Magnification (Scanning)	Adjusts the magnification in the sub scan direction for scanning. If this value is changed, the scanner motor speed is changed. *Use the •/* key to toggle between + and -. See "Replacement and Adjustment - Copy Image Adjustments" for details.*	- 0.9 ~ + 0.9 0.1 %/step **+ 0.0 %**
4010 *		Leading Edge Registration (Scanning)	Adjusts the leading edge registration for scanning. *(-): the image moves in the direction of the leading edge* *Use the •/* key to toggle between + and -. See "Replacement and Adjustment - Copy Image Adjustments" for details.*	- 0.9 ~ + 0.9 0.1 mm/step **+ 0.0 mm**
4011 *		Side-to Side Registration (Scanning)	Adjusts the side-to-side registration for scanning. *(-): the image disappears at the left side.* *(+): The image appears.* *Use the •/* key to toggle between + and -. See "Replacement and Adjustment - Copy Image Adjustments" for details.*	- 0.9 ~ + 0.9 0.1 mm/step **+ 0.0 mm**
4012 *	1 *	Leading Edge Erase Margin (Scanning)	Adjusts the leading edge margin for scanning. *Do not adjust this unless the user wishes to have a scanner margin that is greater than the printer margin.*	0.0 ~ 0.9 0.1 mm/step **1.0 mm**
	2 *	Trailing Edge Erase Margin (Scanning)	Adjusts the trailing edge margin for scanning. *See the comment for SP 4012-1.*	0.0 ~ 0.9 0.1 mm/step **0.5 mm**
	3 *	Left Side Erase Margin (Scanning)	Adjusts the left side margin for scanning. *See the comment for SP 4012-1.*	0.0 ~ 0.9 0.1 mm/step **1.0 mm**
	4 *	Right Side Erase Margin (Scanning)	Adjusts the right side margin for scanning. *See the comment for SP 4012-1.*	0.0 ~ 0.9 0.1 mm/step **0.5 mm**
4013		Scanner Free Run	Performs a scanner free run with the exposure lamp off.	

Mode No.			Function	Settings
Class 1	Class 2			
4301		APS Sensor Output Display	Displays the size of an original placed on the exposure glass.	
			If A5 or 5 1/2" x 8 1/2" is displayed, check the current setting of SP 4303; depending on that SP mode setting, A5 or 5 1/2" x 8 1/2" may be displayed if the APS sensors cannot detect the paper size.	
4303 *		APS Small Size Original Detection	Selects whether or not the copier determines that the original is A5/HLT size when the APS sensor does not detect the size.	**Not detected** A5 length / 5 1/2"X8 1/2
			If "A5 length / 5 1/2" x 8 1/2"" is selected, paper sizes that cannot be detected by the APS sensors are regarded as A5 lengthwise or 5 1/2" x 8 1/2". *If "Not detected" is selected, "Cannot detect original size" will be displayed.*	
4428		Standard White Level Adjustment	Corrects the standard white level of the white plate.	
			This SP mode is for factory use only. Do not change the value.	
4901 *	2 *	GA 1 Setting (GAIN 0)	The coefficient of the D/A converter for the standard AGC gain curve.	0 ~ 255 1 /step **100**
			This SP mode is for factory use only. Do not change the value.	
	5 *	GA 1 Setting (GAIN 1)	The coefficient of the D/A converter for the AGC gain curve at power on.	0 ~ 255 1 /step **100**
			This SP mode is for factory use only. Do not change the value.	
	8 *	GA 1 Setting (REF)	The coefficient of the D/A converter for the AGC gain curve for scanning the white plate.	0 ~ 255 1 /step **100**
			This SP mode is for factory use only. Do not change the value.	
	11 *	GA 1 Setting (Video Data Path)	Selects one of the following video data outputs, which will be used for printing. **0. After GA1 functions** 1. Before auto shading processing 2. After black auto shading processing 3. After all auto shading processing (black and white)	
			Do not change the value.	

Mode No.			Function	Settings
Class 1	Class 2			
4903 *	1 *	GA 3 Setting (Filter Level)	Selects the strengths of the MTF and smoothing filters. **bit 7, 6: Letter Mode (MTF)** 00: Normal 01: Weak 10: Weaker 11: Weakest **bit 5, 4: Generation Mode (MTF)** 00: Normal 01: Weak 10: Weaker 11: Weakest **bit 3: Not used** Keep at "0" **bit 2: Letter/Photo Mode (Smoothing)** 0: Sharp 1: Smooth **bit 1: Photo Mode (MTF)** 0: Weak 1: Strong **bit 0: Photo Mode (Smoothing)** 0: Smooth 1: Sharp	0 ~ 255 **0**
			Input the setting for all 8 bits at once as a decimal value. *(e.g. To set the MTF filter strength of the the generation mode to 'weak', the input value should be 16 as shown below, assuming all other parameters are at the 'zero' setting.* *00010000 → 16* *The type of filter used in Photo mode depends on the setting of SP4904-3.*	
	2 *	GA 3 Setting (Filter Mode)	Selects the coefficients and strengths of the MTF filter and smoothing filter.	0 ~ 16 1 /step **3**
			Do not change the value.	
	3	Not used		
	4 *	GA 3 Setting (White Threshold)	Changes the threshold level for dot screen detection processing.	0 ~ 255 1 /step **80**
			Do not change the value.	
	5	GA3 Setting (Full Size)	Selects whether the copy image is always in the full size mode even if the magnification ratio has been changed.	**0: Normal Operation** 1: Always full size mode
			This SP mode is used for checking the magnification function in the main scan direction, which is performed by the GA3 chip.	
	6	GA 3 Setting (Test Pattern Output)	Prints the test pattern for the GA3 or selects one of the following video data outputs for printing. **0. Normal** 1. Test pattern print out 2. Skips the magnification processing. 3. Skips the filter processing 4. Skips the GA3 functions	
			This SP mode is used for checking the GA3 functions.	

Mode No.			Function	Settings
Class 1	Class 2			
4903	7 *	GA 3 Setting (Main Shift High)	Changes the image shift amount for the main scan direction in magnification mode.	0 ~ 255 1 /step **0**
	8 *	GA 3 Setting (Main Shift Low)	***Do not change the values of 4903-7 and 4903-8.***	
	9 *	GA 3 Setting (Switch Separation)	Changes the threshold ratio for auto text/photo separation processing. *This is used only in the Japanese model.*	25 ~ 255 1 %/step **170 %**
4904 *	1 *	GA4 Setting (Laser Pulse Positioning)	Selects whether LD PWM laser pulse positioning feature is performed or not. *If "No" is selected, the copier always uses the "center" setting (pixels will always have a small separation).*	0: OFF **1: ON**
	2 *	GA4 Setting (Photo Matrix)	Selects the matrix size for photo mode. *• 8 x 8 is only used if 4904-4 is set to "binary". Also, if 4904-4 is set to binary, 4904-2 will be ignored if the setting is other than 8 x 8.* *• 6 x 6 (New) should be selected when a light original is used.* *• 4 x 4 leads to a sharper image*	0: 4 x 4 **1: 6 x 6** 2: 8 x 8 3: 6 x 6 (New)
	3 *	GA4 Setting (Filter Select in Photo Mode)	Selects either the MTF filter or the smoothing filter in Photo mode. *The strength of the MTF filter can be selected with SP4903-1, bit 1.* *The strength of the Smoothing filter can be selected with SP4903-1, bit 0.* *If you select the MTF filter, the image resolution is improved. However, the dot screen areas will be faint.*	0: MTF filter **1: Smoothing filter**
	4 *	GA4 Setting (Binary Process Mode)	Selects whether binary picture processing mode is performed or not. *If YES is selected, all image processing modes are handled using binary picture processing mode.*	**0: NO** 1: YES
	6	GA4 Setting (Generation Mode)	Selects the line width correction type in the generation mode. *In generation mode, lines may bulge in the main scan direction. Adjust this SP mode until the result is satisfactory.*	0: Not corrected 1: Thin line-1 **2: Thin line-2** 3: Thick line
	7	GA4 Setting (Image Process mode in Letter/ Photo mode: Letter areas)	Selects the image processing mode used for Letter areas in Letter/Photo mode. **0: 1 x 1 dot processing** 1: Error diffusion with 1 x 1 dot processing 2: 2 x 1 dot processing 3: Error diffusion with 2 x 1 dot processing *A larger value cases the image to became lighter. Only works if 4904-4 is at 0.*	

Service Tables

Mode No.			Function	Settings
Class 1	Class 2			
4904	8	GA4 Setting (Image Process mode in Letter/Photo mode: Photo Areas)	Selects the image processing mode used for photo areas in the Letter/Photo mode. 0: 1 x 1 dot processing 1: Error diffusion with 1 x 1 dot processing 2: 2 x 1 dot processing **3: Error diffusion with 2 x 1 dot processing**	
			A smaller value causes the image to become more sharp in focus. *Only works if 4904-4 is at 0.*	
	10	GA4 Setting (GA4 Test Data)	Prints the test pattern for the GA4 IC, to test the GA4 chip on the EX-IPU. **0: No Print** 1: Gradation 2: Cross 3: Black bands	
	12 *	GA4 Setting (BK Thresh Level)	Changes the threshold level for binary picture processing mode.	0 ~ 255 1 /step **40**
			A larger value causes the image to become lighter.	
	13 *	GA4 Setting (Top point Level)	The value for pixels at an edge in binary picture processing mode.	0 ~ 255 1 /step **128**
			Do not change the value.	
	14 *	GA4 Setting (All Black Level)	The value for black areas in binary picture processing mode.	0 ~ 255 1 /step **255**
			Do not change the value.	
	16 *	GA4 Setting (Print Top Point Level)	The value for pixels at an edge in stamp mode.	0 ~ 255 1 /step **128**
			Do not change the value.	
	17 *	GA4 Setting (Print All Black Level)	The value for black areas in stamp mode.	0 ~ 255 1 /step **255**
			Do not change the value.	
	18 *	GA4 Setting (Dither Pattern)	Selects the dither pattern used in binary picture processing mode.	**0: 70-line** 1: 95-line 2: 140-line 3: 180-line
			Do not change the value.	
4905	1	Path Setting (ASAP Video In)	***These SP modes are used for design purposes only.*** ***Do not change the settings.***	**0**
	2			
4907		GA4 Setting (Auto letter/photo separation)	Selects whether the auto letter/photo separation is performed in the Letter/Photo mode or not.	Disabled **Enabled**
			Test purposes only	

Mode No.			Function	Settings
Class 1	Class 2			
4909	1	GA4 Setting (Pulse Width Modulation)	Decides the threshold level for selecting the type of pulse width modulation that is used. ***Do not change the value.***	0 ~ 255 1 /step **0**
	2	GA4 Setting (Line Width Correction 1 : White	Decides the threshold value for a pixel to be white when line width correction type 1 is performed. ***Do not change the value.***	0 ~ 255 1 /step **0**
	3	GA4 Setting (Line Width Correction 1 : Black	Decides the threshold value for a pixel to be black when line width correction type 1 is performed. ***Do not change the value.***	0 ~ 255 1 /step **0**
	4	GA4 Setting (Line Width Correction 2 : White	Decides the threshold value for a pixel to be white when line width correction type 2 is performed. ***Do not change the value.***	0 ~ 255 1 /step **0**
	5	GA4 Setting (Line Width Correction 2 : Black	Decides the threshold value for a pixel to be black when line width correction type 2 is performed. ***Do not change the value.***	0 ~ 255 1 /step **0**
	6	GA4 Setting (Error Diffusion Gamma)	Selects the gamma type for error diffusion. ***Do not change the value.***	0 ~ 7 1 /step **0**
	7	GA4 Setting (Edge Detection 1)	Decides the threshold value to calculate the difference value between the object pixel and the surrounding pixels. ***Do not change the value.***	0 ~ 255 1 /step **0**
	8	GA4 Setting (Edge Detection 2)	Decides the threshold value for detecting the edge area. ***Do not change the value.***	0 ~ 255 1 /step **0**
	17	GA4 Setting (Background Pattern Merge Method)	Selects whether an image which overlaps a background numbering pattern is converted from positive to negative or not. *This SP mode is used when a background numbering pattern is overlapping a solid black area.*	**0: Not converted** 1: Converted

Mode No.			Function	Settings
Class 1	Class 2			
4909	18	GA4 Setting (Stamp Pattern Merge Method)	Selects whether an image which overlaps a stamp pattern is converted from positive to negative or not. The settings 0 and 1 are the same as for 4909-17 above. The setting 2 means that the black level of the stamp (SP4904-17) is inverted (e.g. when the black level of the stamp is 200, the stamp pattern is printed at black level 55.) *This SP mode is used when a stamp pattern is overlapping a solid black area.*	**0: Not converted** 1: Converted 2: Inverted
	19	GA4 Setting (Data Path Selection 1)	***These SP modes are used for design purposes only.*** ***Do not change the settings.***	**0**
	20	GA4 Setting (Data Path Selection 2)	***These SP modes are used for design purposes only.*** ***Do not change the settings.***	**0**
4911	1	HDD Setting (Media Test)	Checks for bad sectors on the hard disk that develop during machine use. This takes 4 minutes. *This SP mode should be done when an abnormal image is printed. There is no need to do this at installation as the hard disk firmware already contains bad sector information, and damage is not likely during transportation.* *Bad sectors detected with this SP mode will be stored in the E^2PROM on the EX-IPU board with the bad sector data copied across from the firmware.*	
	2	HDD Setting (Formatting)	Formats the hard disk. This takes 10 seconds.	
	3	HDD Setting (Spindle Control)	Decides the disk drive motor (spindle motor) stop timing. Yes: The hard disk stops in low power mode. The first copy after returning to standby will take longer. No: The hard disk keeps going in low power mode	
	4	HDD Setting (Head Retraction)	Press Enter to move the head of the hard disk away from the disk while the disk is turning. The head automatically moves back when a copy is made. *This SP should be performed when the machine will be moved without turning the main switch off.*	

Mode No.			Function	Settings
Class 1	Class 2			
4911	5	HDD Setting (Total Storage Capacity)	Input the total storage capacity of the hard disk at replacement. *In future, hard disks of various sizes may be available. In this case, use this SP mode when installing a new disk.*	
	6	HDD Setting (Bad Sector Information Reset)	Resets the bad sector information which is stored in the E^2PROM on the EX-IPU board. *This SP should be performed when the hard disk is replaced.*	
	7	HDD Setting (Bad Sector Display)	Displays the number of bad sectors there are on the hard disk.	
5019		LCT Paper Size Setting	Selects the paper size for the LCT. *When changing the setting, the position of the side fences for the LCT should be changed.*	A4 (230V machines) 8 1/2 X 11 (115V machines)
5104 *		A3/11"x17" Double Count	Specifies whether the counter is doubled for A3/11"x17" paper. *If "YES" is selected, the total counter and the current user code counter counts up twice when A3/11"x17" paper is used.*	**No** Yes
5106 *		ADS Level Selection	Selects the image density level that is used in ADS mode.	1 ~ 7 1 notch /step **4**
5118 *		Disable Copying	Selects whether the copy function is disabled or not.	**No** Yes
5220 *		Auto Stamp Function	Selects whether the auto stamp function is enabled or not.	On (115V machine) Off (230V machine)
5305		Auto Off Mode	**This SP mode is used only for 115V machines (Energy Star standardization).** Selects whether the auto off timer setting is enabled or disabled *When "disabled" is selected, the auto off timer range will be wider than the default timer range. (In UP mode, the user will be able to select a time between 0 and 120 minutes.) If "0" is selected, the auto off timer function is disabled.*	**Enabled** Disabled
5501 *	1	PM Alarm	Selects whether the PM alarm is enabled or not.	**Enabled** Disabled
5501	2	PM Alarm Interval	Sets the PM interval, with an alarm. *When the setting is "0", this function is disabled.*	0 ~ 255 1k copies/step **120 k copies**

Service Tables

Mode No.			Function	Settings
Class 1	Class 2			
5801		Memory All Clear	Resets all correction data for process control and all software counters. Also, returns all modes and adjustments to the default settings. See the "MEMORY ALL CLEAR" section for how to use this SP mode correctly. ***Normally, this SP mode should not be used.*** *It is used only after replacing the NVRAM, or when the copier malfunctions due to a damaged NVRAM.*	
5802		Free Run	Performs a free run. The scanner scans once and the printer prints for the number of copies requested.	
5803	1 ~ 9	Input Check	Displays the signals received from sensors and switches. See the "INPUT CHECK" section for details.	
5804		Output Check	Turns on the electrical components individually for test purposes. See the "OUTPUT CHECK" section for details.	
5807		Option Connection Check	Checks the connectors to the options.	
5811 *		Machine Serial Number	Use to input the machine serial number. *This serial number will be printed on the system parameter list.*	
5812 *		Service Telephone Number	Use this to input the telephone number of the service representative (this is displayed when a service call condition occurs.) *Press the "•/#" key to input a pause (—). Press the "Clear modes" key to delete the telephone number.*	
5902		Duplex Tray Capacity Limit for A3 Copies	Selects the total capacity of the duplex tray for A3 paper. *If there are frequent jams at the duplex unit when using A3 paper, try setting this to 30.*	**50 sheets** 30 sheets
5920 *		Fusing Temp. Setting - Low Power Mode	Selects the fusing temperature that will be used in low power mode. *If a low temperature is selected, it takes more time to reach the ready condition.*	**(115V ver.)** **125 °C** 100 °C **(230V ver.)** 170 °C **155 °C** 125 °C 100 °C

Mode No.			Function	Settings
Class 1	Class 2			
5990	1	SP Mode Data Printing (All Data)	Prints all the system parameter lists. See the "SYSTEM PARAMETER AND DATA LISTS" section for how to print the lists. *Printing takes 6 minutes.*	
	2	SP Mode Data Printing (SP Mode Data)	Prints the SP mode data list. See the "SYSTEM PARAMETER AND DATA LISTS" section for how to print the lists. *Printing takes 2 minutes.*	
	3	SP Mode Data Printing (UP Mode Data)	Prints the UP mode data list. See the "SYSTEM PARAMETER AND DATA LISTS" section for how to print the lists. *Printing takes 2 minutes.*	
	4	SP Mode Data Printing (Machine Status Data)	Prints the machine status history data list. See the "SYSTEM PARAMETER AND DATA LISTS" section for how to print the lists. *Printing takes 2 minutes.*	
6006 *	1 *	ADF Side-to Side Registration	Adjusts the printing side-to-side registration in the ADF mode. *Use the •/∗ key to toggle between + and -.*	-3 ~ +3 0.1 mm/step **+ 0.0 mm**
	2 *	ADF Leading Edge Registration (Simplex)	Adjusts the original stop position. *Use the •/∗ key to toggle between + and -.*	-3 ~ +3 0.1 mm/step **+ 0.0 mm**
	3 *	ADF Leading Edge Registration (Duplex-front)	Adjusts the original stop position against the original left scale in one-sided original mode. *Use the •/∗ key to toggle between + and -.*	-3 ~ +3 0.1 mm/step **+ 0.0 mm**
	4 *	ADF Leading Edge Registration (Duplex-rear)	Adjusts the original stop position against the original left scale in two-sided original mode. *Use the •/∗ key to toggle between + and -.*	-3 ~ +3 0.1 mm/step **+ 0.0 mm**
	For details on the correct way to use SP 6006, see the ADF service manual.			
6009		ADF Free Run	Performs an ADF free run. *This is a general free run controlled from the copier. For more detailed free run modes, see the DF manual.*	
6105 *		Finisher Staple Position Adjustment	Adjusts the staple position when using the finisher. *Use the •/∗ key to toggle between + and -.* ***One staple position:** A larger value causes the staple position to shift inward.* ***Two staple position:** A larger value causes both staple positions to shift to the rear side of the machine.*	- 1~ +3.5 0.5 mm/step **+0.0 mm**

Mode No.			Function	Settings
Class 1	Class 2			
6107		Finisher Free Run	Performs a finisher free run (without stapler). *This is a general free run controlled from the copier. For more detailed free run modes, see the finisher manual.*	
7004		Total Copy Counter Reset	Resets or changes the initial electrical counter.	
7804		PM Counter Reset	Resets the PM counter.	To see the current counter values, print the SP mode data lists (SP 5990).
7807		SC/Jam Counter Reset	Resets the SC and jam counters.	
7808		Resets Counters (except for the total counter)	Resets the following counters: On the data list, between "Total No of Org from ADF" and "Number of SCs: Others", and between "Counter from ADF" and "Staple Mode".	
7810		User Code Number Reset	Resets the user code numbers.	
7901	1	ROM/CPU Version (Operation Panel)	Displays the operation panel board ROM version.	
	2	ROM/CPU Version (MSIS)	Displays the ROM version for the MSIS on the SCU board.	
	3	ROM/CPU Version (Copy App.)	Displays the ROM version for the copy application on the SCU board.	
	4	ROM/CPU Version (BCU:68340)	Displays the CPU version for the fusing controller on the BCU board.	
	5	ROM/CPU Version (AC Power Control)	Displays the ROM version for AC power control on the AC drive board.	
	6	ROM/CPU Version (High Voltage)	Displays the ROM version for the high voltage control board.	
	7	ROM/CPU Version (EX-IPU)	Displays the ROM version for the EX-IPU board.	
	8	ROM/CPU Version (ADF)	Displays the ROM version for the ADF.	
	9	ROM/CPU Version (Paper Feed Unit)	Displays the ROM version for the paper feed unit.	

Mode No.			Function	Settings
Class 1	Class 2			
7901	10	ROM/CPU Version (Sorter/ Finisher)	Displays the ROM version for the sorter/finisher.	
	11	ROM/CPU Version (MSU)	Displays the ROM version for the memory unit on the EX-IPU board.	

2.2.2 TEST PATTERN PRINTING (SP 2902)

1. Access the SP mode which holds the test pattern that you need.
2. Touch the "Copy Mode" button on the display to access the copy mode display.
3. Select the required copy features such as paper size, image density, reduction.
4. Press the "Start" key on the operation panel.
5. After checking the test pattern, leave copy mode by touching the "SP Mode" button on the display.
6. Touch the "Quit" button to leave the SP mode.

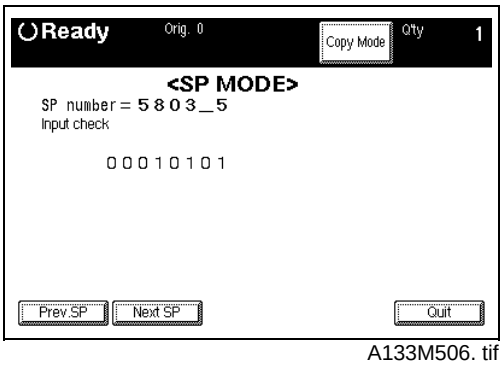
⚠ CAUTION

Before leaving the SP mode, return the setting of the SP mode to 0 (No Print). Otherwise, the user will get a test pattern whenever taking a copy.

Test Pattern Table for SP2902-3

No.	Test Pattern	No.	Test Pattern
0	No Print	16	32 Grayscales (Horizontal)
1	Vertical Lines (1 dot)	17	32 Grayscales (Vertical)
2	Horizontal Lines (1 dot)	18	32 Grayscales (Vert./Hor.)
3	Vertical Lines (2 dots)	19	32 Grayscales (V/H Overlay)
4	Horizontal Lines (2 dots)	20	64 Grayscales (Horizontal)
5	Grid Pattern (single dot)	21	64 Grayscales (Vertical)
6	Grid Pattern (double dots)	22	64 Grayscales (Vert./Hor.)
7	Alternating Dot Pattern	23	64 Grayscales (V/H Overlay)
8	Full Dot Pattern	24	128 Grayscales (Horizontal)
9	Black Band	25	128 Grayscales (Vertical)
10	Trimming Area	26	128 Grayscales (Vert./Hor.)
11	Argyle Pattern	27	128 Grayscales (Vert./Hor. Overlay)
12	16 Grayscales (Horizontal)	28	256 Grayscales (Horizontal)
13	16 Grayscales (Vertical)	29	256 Grayscales (Vertical)
14	16 Grayscales (Vert./Hor.)	30	256 Grayscales (Vert./Hor.)
15	16 Grayscales (Vert./Hor. Overlay)	31	256 Grayscales (Vert./Hor. Overlay)

2.2.3 INPUT CHECK (SP5803)



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1. Access SP mode 5803.
2. Select the class 2 SP number which will access the switch or sensor you wish to check (see the table that follows this procedure).
3. Check the status of the sensor or switch.

   NOTE: If you wish to change to another class 2 level, touch "Next SP" or "Prev. SP" on the display.
4. If you wish to check the signal during a copy cycle, enter copy mode from the SP mode, select the required copy modes, then press the Start key. After that, go back to the SP mode to check the signal.
5. The reading ("0" or "1") will be displayed. The meaning of the display is as follows.

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0	0	0	0	0	0	0	0

Class 2 no.	bit no.	Description	Reading	
			0	1
1	7	Not used		
	6	LCT Paper End Sensor	Paper not detected	Paper detected
	5	Not used		
	4			
	3			
	2			
	1	Registration Sensor	Paper detected	Paper not detected
	0	Not used		

Class 2 no.	bit no.	Description	Reading	
			0	1
2	7	Not used		
	6	LCT Switch	LCT unit closed	LCT unit open
	5	Front Cover Safety Switch	Front cover closed	Front cover open
	4	Relay Sensor 3 (Option PFU)	Paper not detected	Paper detected
	3	Relay Sensor 2 (Option PFU)	Paper not detected	Paper detected
	2	Relay Sensor 1 (Option PFU)	Paper not detected	Paper detected
	1	By-pass Feed Paper End Sensor	Paper detected	Paper not detected
	0	By-pass Feed Table Switch	By-pass feed table closed	By-pass feed table open
3	7	Thermistor	Normal	Overheat
	6	Not used		
	5	Toner End Sensor	No toner	Toner present
	4	Toner Overflow Sensor	Bottle not full	Bottle full
	3	Not used		
	2	Transfer Belt Position Sensor	Transfer belt down	Transfer belt up
	1	Not used		
	0			
4	7	Not used		
	6			
	5	LCT Tray Down Switch	Switch not pressed	Switch pressed
	4	LCT Lower Limit Sensor	Bottom plate not at lower position	Bottom plate at lower position
	3	LCT Upper Limit Sensor	Paper not at high position	Paper at high position
	2	LCT Set Signal	Not connected	Connected
	1	LCT Cover Sensor	LCT cover closed	LCT cover open
	0	LCT/By-pass Relay Sensor	Paper not detected	Paper detected
5	7	DIP Switch 8 (BCU)	Not used	
	6	DIP Switch 7 (BCU)	Not used	
	5	DIP Switch 6 (BCU)	Version Setting (see Table 1)	
	4	DIP Switch 5 (BCU)	Version Setting (see Table 1)	
	3	DIP Switch 4 (BCU)	SC is enabled	SC is disabled
	2	DIP Switch 3 (BCU)	No duplex	Duplex
	1	DIP Switch 2 (BCU)	Black	Twin Color
	0	DIP Switch 1 (BCU)	25 CPM	40 CPM

Class 2 no.	bit no.	Description	Reading	
			0	1
6	7	Print start signal	Not activated	Activated
	6	Main Motor Lock signal	Not detected	Detected
	5	Ozone Fan Motor Lock signal	Not detected	Detected
	4	Exhaust Fan Motor Lock signal	Not detected	Detected
	3	By-pass Feed Table Paper Width Data	See Table 2	
	2			
	1			
	0			
7	7	Not Used		
	6	Upper Relay Sensor	Paper not detected	Paper detected
	5	Not Used		
	4			
	3			
	2			
	1			
	0			
8	7	Paper End Sensor	Paper detected	Paper not detected
	6	Lower Relay Sensor	Paper not detected	Paper detected
	5	Tray Upper Limit Sensor	Paper not at high position	Paper at high position
	4	Tray Paper Size Sensor - 5	Switch not pressed	Switch pressed
	3	Tray Paper Size Sensor - 4	Switch not pressed	Switch pressed
	2	Tray Paper Size Sensor - 3	Switch not pressed	Switch pressed
	1	Tray Paper Size Sensor - 2	Switch not pressed	Switch pressed
	0	Tray Paper Size Sensor - 1	Switch not pressed	Switch pressed

Class 2 no.	bit no.	Description	Reading	
			0	1
9	7	Duplex Unit Set Signal	Not detected	Detected
	6	Fusing Unit Set Signal	Not detected	Detected
	5	Fusing Exit Sensor	Paper not detected	Paper detected
	4	Duplex End Fence H.P Sensor	End fence not at home position	End fence at home position
	3	Duplex Side Fence H.P Sensor	Side fence not at home position	Side fence at home position
	2	Duplex Turn Sensor	Paper not detected	Paper detected
	1	Duplex Entrance Sensor	Paper not detected	Paper detected
	0	Duplex Paper End Sensor	Paper not detected	Paper detected

Table 1: Version Setting

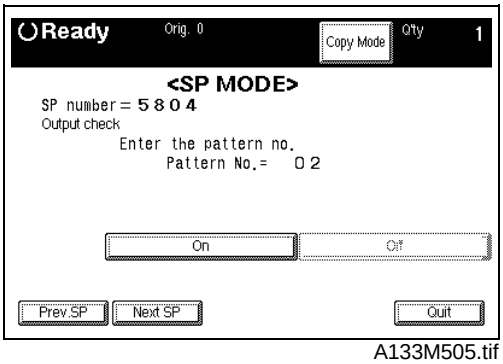
Class 2 no.	Bit 4	Bit 5	Version
5	0	0	Japanese version
	1	0	120V version
	0	1	230V version
	1	1	Not used

Table 2: By-pass Feed Table Paper Size Data

Class 2 no.	Bit 3	Bit 2	Bit 1	Bit 0	Paper Width
6	0	0	0	0	Post Card
	0	0	0	1	B6 Lengthwise
	0	0	1	0	B5 Lengthwise
	0	0	1	1	A5 Lengthwise / 5 1/2"
	0	1	0	0	B4 Lengthwise
	0	1	1	0	A4 Lengthwise / 8 1/2" / 8"
	1	0	0	0	A3 Lengthwise
	1	1	0	0	11" x 17"

1: Contact closed

2.2.4 OUTPUT CHECK (SP5804)



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⚠ CAUTION

Motors keep turning in this mode regardless of upper or lower limit sensor signals. To prevent mechanical or electrical damage, do not keep an electrical component on for a long time.

1. Access SP mode 5804.
2. Selects the SP number that corresponds to the component you wish to check (see the table following this procedure), then press [#] .
3. Touch "ON" on the display to check the function.
4. Touch "OFF" on the display to interrupt the function.
5. If you wish to check another component, do the following procedure.
    1). Press [C/⊘]
    2). Enter the new SP number for the component you wish to check next.
    3). Press [#]

Service Tables

- Output check table -

No.	Description	No.	Description
1	Not used	51	Transport Drive Motor (Optional Finisher)
2	Not used	52	Junction Gate Solenoid (Optional Finisher)
3	Not used	53	Shift Tray Lift Motor (Optional Finisher)
4	Relay Clutch	54	Jogger Motor (Optional Finisher)
5	Registration Clutch	55	Not used
6	Paper Feed Clutch	56	Staple Motor (Optional Finisher)
7	Pick-up Solenoid		
8	Separation Solenoid	60	Duplex Motor (Forward)
9	Main Motor	61	Duplex Motor (Reverse)
10	Quenching Lamp	62	Side Jogger Motor (Duplex Tray)
11	Charge Corona & Grid Bias	63	End Jogger Motor (Duplex Tray)
12	Development Bias	64	Main Switch (Tests Auto Off Mode)
13	Transfer Belt Bias	65	Not used
14	Not used	66	Ozone Fan Motor
15	Not used	67	Cooling Fan Motor
16	Development Clutch	68	Exhaust Fan Motor
17	Toner Supply Motor	69	Not used
18	Toner Bottle Drive Motor	70	Not used
19	Not used	71	Not used
20	Not used	72	Not used
21	ID Sensor	73	Not used
22	Transfer Belt Lift Clutch (Up)	74	Not used
23	Transfer Belt Lift Clutch (Down)	75	Corona Wire Cleaner
24	Junction Gate Solenoid	76	Charge Corona Bias
25	Not used	77	Grid Bias
26	1st Paper Feed Cl (Optional PFU)	78	Not used
27	1st Pick-up Sol (Optional PFU)	79	Not used
28	1st Separation Sol (Optional PFU)	80	Not used
29	2nd Paper Feed Cl (Optional PFU)	81	DF Feed Motor (Forward)
30	2nd Pick-up Sol (Optional PFU)	82	DF Feed Motor (Reverse)
31	2nd Separation Sol (Optional PFU)	83	DF Belt Motor (Forward)
32	Main Motor (Optional PFU)	84	DF Belt Motor (Reverse)
33	3rd Paper Feed Cl (Optional PFU)	85	DF Feed Motor (Forward)
34	3rd Pick-up Sol (Optional PFU)	86	DF Solenoids (All solenoids)
35	3rd Separation Sol (Optional PFU)	87	DF LEDs
36	Relay Clutch (Optional PFU)	88	Not used
37	By-pass Feed Clutch	89	Not used
38	Not used	90	Not used
39	LCT Pick-up Solenoid	91	Not used
40	LCT/By-pass Pick-up Solenoid	92	Not used
41	LCT/By-pass Relay Clutch	93	Not used

2.2.5 SYSTEM PARAMETER AND DATA LISTS (SP5990)

1. Access SP mode 5990 and select the class 2 SP mode number corresponding to the list that you wish to print.
2. Touch the "Copy Mode" button on the display to access the copy mode display.
3. Select the paper size.

   NOTE: A paper size larger than A4 or 8 1/2" x 11" should be selected.

4. Touch the "SP Mode" button then the "Print" button on the display.
5. Touch the "Copy Mode" button on the display.
6. Press the "Start" key on the operation panel to print the list.
7. After printing the list, leave copy mode by touching the "SP Mode" button on the display.
8. Touch the "Quit" button to leave the SP mode.

2.3 SP MODE AFTER REPLACEMENT AND CLEANING

The following table shows the necessary SP modes and their order of execution when the listed items are replaced or cleaned.

●: After replacement ❍: After cleaning

No.	SP Mode No.	Item Description	Developer	TD Sensor	Drum	ID Sensor	Test Development Unit (with toner already in it)
1	2801	TD sensor initial setting **(See the note below.)**	●	●			
2	2220	V_{TREF} manual setting					●
3	3001	ID sensor initial setting			●	● ❍	

NOTE: TD sensor initial setting can only be performed after warming up the machine completely.

2.4 MEMORY ALL CLEAR (SP5801)

⚠ CAUTION

Memory All Clear mode resets all the settings that are stored in the NVRAM to the default settings. These settings are the correction data for process control and all the software counters.
Normally, this SP mode should not be performed, This procedure is required only after replacing the RAM board or when the copier malfunctions due to a damaged RAM board.

1. Print out all System Parameter Lists (SP mode 5990).
2. Enter SP mode 5801.
3. Hold the C/⊗ key for more than 3 seconds.
4. Turn the main switch off and back on.
5. Perform the Touch Screen Adjustment procedure (see the "Touch Screen Adjustment" chapter in the Replacement and Adjustment section).
6. Do the printer and scanner registration and magnification adjustments (see section 12 of Replacement and Adjustment).
7. Enter the values which had been changed from the factory settings, referring to the system parameter list (the values which have an "✻" mark next to them had been changed). In particular, the values for SP2220, SP3001, SP4901-2, SP4901-5, and SP4901-8 must be input.
8. Check the copy quality and the paper path, and do any necessary adjustments.

2.5 USER CODE FEATURE

If the user wishes to use the User Code Feature, the key counter connector must be disconnected. Refer to Installation - Key Counter for how to do this.

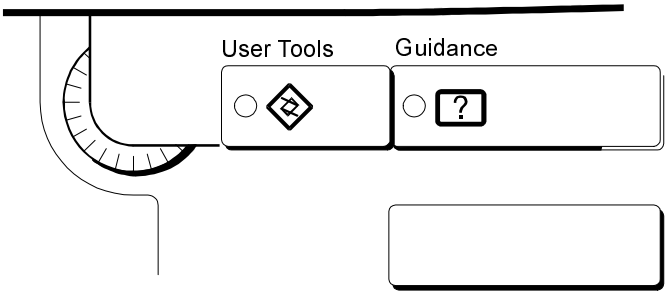
For how to store User Codes, refer to the operating instructions.

3. USER PROGRAM MODE

The user program (UP) mode is accesed by the key operators, and sales and service staff. This mode is used to input the copier's default settings.

3.1 How to Enter and Leave UP Mode

Press the User Tools button



A133I512.wmf

3.2 UP Mode Table

Menu	
Basic Settings	Auto Response (Human) Sensor
	Operation Panel Beeper
	Copy Counter Display
	Set Date
	Set Time
	Auto Reset
	Low Power Timer
	Auto Off Timer
	Paper Type Display (for each tray)
	Tray 1 <*> Paper Size Setting
	Tray 1 <F/F4> Paper Size Setting
	Paper Size Setting (for tray 2,3, and 4 (Optional))
	Paper Tray Priority
	Original <F/F4> Size Setting
	ADF: Thin Paper Mode
	Auto Tray Switching
	Set User Code(s)

Menu			
Copy Features	**Copy Modes**	Auto Paper Select Priority	
		Auto Image Density Priority	
		Original Mode Priority	
		Full Main Menu Display	
		Duplex Mode Priority	
		User Reproduction Ratio 1, 2	
		Maximum Copy Quantity	
		Original Beeper	
	Adjust Image	Margin Adjust Front	
		Margin Adjust Back	
		Erase Border	
		Erase Center	
		Double Copies Separation Line	
		Combine Originals Booklet Format	
		Image Repeat Separation Line	
	Stamp	Page Numbering Format	
		P1,P2 1/5,2/5.... Format Position	
		-1-,-2- Format Position	
		Auto Stamping	
		Stamp Layout	Size
			Density
			Position
		User Stamp	
		User Stamp Layout	Size
			Density
			Position
		Date Position/Format	Date Format
			Orientation
			Position Top Left
			Position Bottom Right
		Background Numbering Size	
		Background Numbering Density	
	Input/ Output	Duplex Remaining Copy Exit	
		Combine Remaining Copy Exit	
		SADF Auto Reset Timer	
		Mixed Original Sizes	
		ADF Auto Sort Mode	
		Memory Full Auto Scan Restart	
		Rotate Sort Auto Paper Continue	

Service Tables

4. TEST POINTS/DIP SWITCHES/LEDS

4.1 DIP SWITCHES

BCU (Base Engine Control Unit): DIP SW201

No.	Function	ON	OFF
1	Copy Speed	**200 mm/s**	150 mm/s
2	Development Unit Type	Twin color	**Mono color**
3	Duplex Unit	**Installed**	Not installed
4	SC Generation	Disabled	**Enabled**
5	Destination	Off / Off) Japan; On / Off) N.America; Off / On) Europe; On / On) Not used	
6			
7	Not used		
8	Not used		

Do not change the settings of switches 1 to 4. They should be kept at the settings indicated in bold type in the above table.

SCU (System Control Unit): DIP SW401

No.	Function	ON	OFF
1,2	Not used		
3	Ricoh/OEM setting	OEM	Ricoh
4~8	Not used		

4.2 TEST POINTS

BCU (Base Engine Control Unit)

Number	Label	Monitored Signal
TP 208	**(GND)**	Ground

SCU (System Control Unit)

Number	Label	Monitored Signal
TP 402	**(GND)**	Ground

EX-IPU (Expanded - Image Processing Unit)

Number	Label	Monitored Signal
TP 1	**(GND)**	Ground
TP 2	**(GND)**	Ground
TP 5	**(GND)**	Ground
TP 25	**(+ 5V)**	+ 5V
TP 26	**(GND)**	Ground
TP 27	**(- 12V)**	- 12V
TP 28	**(+ 24V)**	+ 24V
TP 29	**(+ 12V)**	+ 12V
TP 40	**(GND)**	Ground
TP 43	**(GND)**	Ground

4.3 LEDS

BCU (Base Engine Control Unit)

Number	Monitored Signal
LED 201	Monitors the CPU (IC401). Usually, this LED is blinking.
LED 202	Monitors the sub CPU (IC213), fusing lamp control, and the +24V line condition. Usually, this LED is blinking. When the IC is not working properly, both LED201 and 202 are turned off. When there is an abnormal fusing lamp control condition or the +24V line is cut, this LED blinks faster than normal.

SCU (System Control Unit)

Number	Monitored Signal
LED 401	Monitors the MPU (IC401). Usually, this LED is blinking. If this LED is either always lit or always off, the MPU is not working properly.

Lamp Stabilizer

Number	Monitored Signal
LED 1	Lights when the exposure lamp turns on.

4.4 VARIABLE RESISTORS

EX-IPU (Expanded Image Processing Unit)

Number	Function
VR 1	Adjusts the differences between the odd white level and the even white level
	Do not adjust.
VR 2	Adjusts the original background erase level.
	Do not adjust.

5. PREVENTIVE MAINTENANCE SCHEDULE

5.1 PM TABLE

NOTE: The amounts mentioned as the PM interval indicate the number of copies.

Symbol key: C: Clean, R: Replace, L: Lubricate, I: Inspect

A133	EM	120K	240K	360K	NOTE
SCANNER/OPTICS					
Mirrors, Lens, Reflectors		C	C	C	Optics cloth or blower brush
Exposure Glass	C	C	C	C	Alcohol or glass cleaner
Exposure Lamp	I	I	I	I	Replace if necessary
Green Filter		C	C	C	Dry cloth
Scanner Guide Rails		C	C	C	Dry cloth
APS sensors		C	C	C	Blower brush
Lens Block Guide Rail		C	C	C	Dry cloth
Toner Shield Glass	C	C	C	C	Dry cloth
Dust Filter			R		
AROUND THE DRUM					
Corona Wires	C	R	R	R	Dry cloth
End Blocks and Casing	C	C	C	C	Water
Charge Grid	C	R	R	R	Water
ID Sensor	C	C	C	C	Blower brush or dry cloth After cleaning, do SP3001.
Quenching Lamp			C		Dry cloth
Pick-off Pawls		C	R	C	Dry cloth
DEVELOPMENT UNIT					
Development Drive Gears	I	I	I	I	Replace if necessary. Anyway, replace the drive gears every 480K.
Mold Gear		I	I	I	
Side Seal		I	I	I	
Development Filter		C	C	R	Vacuum cleaner
Entrance Seal	C	I	I	I	Dry cloth. Replace if necessary
Toner Supply Unit	C	C	C	C	Blower brush
Developer				R	Replace if necessary
Rear Sleeve		C	C	C	Dry cloth. See Note 2.
PAPER FEED (for each paper feed station)					
Pick-up, Feed, Separation Rollers (Paper tray)	C	C	R	C	Clean with water. Replace these rollers as a set.
Pick-up, Feed, Separation Rollers (LCT,By-pass feed)	C	C	R	C	Clean with water. Replace these rollers as a set.
Paper Dust			C		Dry cloth
Paper Feed Guide Plate		C	C	C	Alcohol
Relay rollers		C	C	C	Alcohol or water
Registration roller		C	C	C	Alcohol or water

A133	EM	120K	240K	360K	NOTE
Bottom Plate Pad (Paper tray, By-pass feed, LCT)	C	R	R	R	Water. Replace if necessary.
Registration Sensor		I	I	I	
CLEANING UNIT					
Drum Cleaning Blade		R	R	R	Spread setting powder. See "Drum Cleaning Blade Replacement".
Brush Roller			R		
Side Seal		C	C	C	Blower brush. Replace if necessary
Cleaning Entrance Seal		C	C	C	
Inside of the Cleaning Unit		C	C	C	Blower brush or vacuum cleaner
TRANSFER BELT UNIT					
Transfer Belt	C	I	R	I	Dry cloth. Replace if necessary
Transfer Belt Cleaning Blade	C	R	R	R	Dry cloth. Apply setting powder or toner after cleaning.
Rollers		I	C	I	Dry cloth. Replace if necessary
Transfer Entrance Guide Plate	C	C	C	C	Dry cloth
Transfer Guide Plate	C	C	C	C	Dry cloth
Used Toner Tank	I	C	C	C	Empty the tank.
FUSING UNIT					
Fusing Entrance and Exit Guide Plates		C	C	C	Suitable solvent - do not use water
Fusing Lamp		I	I	I	Replace if necessary
Hot Roller		R	R	R	
Pressure Roller		R	R	R	
Fusing Thermistor	C	I	I	I	Clean if necessary with a suitable solvent (not water)
Hot Roller Bushings		R	R	R	
Fusing Antistatic Brush		I	I	I	Replace if necessary
Cleaning Roller		C	C	C	Suitable solvent - not water
Cleaning Roller Bushings		C	C	C	Suitable solvent - not water. Replace if necessary
Hot Roller Strippers		C	R	C	Dry cloth
DUPLEX TRAY					
Clutch Spring		L	L	L	Mobil Temp 78. See Note 1.
Feed Roller		R	R	R	
Bottom Plate Pad		R	R	R	
Mylars		I	I	I	Replace if necessary
OTHERS					
Drive Belts			I		Replace if necessary

	EM	80K	160K	240K	NOTE
AUTO DOCUMENT FEEDER (for originals)					
Transport Belt	C	R	R	R	Belt cleaner
Friction Belt	C	R	R	R	Water
Feed Roller	C	R	R	R	Water

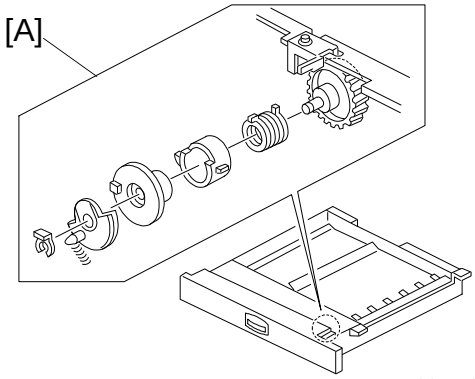
	EM	120K	240K	360K	NOTE
PAPER TRAY UNIT (A549/550)					
Pick-up, Feed, Separation Rollers	C	C	R	C	Water, Replace these rollers as a set.
Relay Rollers		C	C	C	Alcohol or water
Bottom Plate Pad	C	R	R	R	Water
Relay Clutch		I	I	I	Replace every 1500K copies.
Feed Clutch		I	I	I	Replace if necessary
Drive Belts		I	I	I	Replace if necessary

	EM	120K	240K	360K	NOTE
FINISHER (A612)					
Rollers	C	C	C	C	Water.
Bushings	I	I	I	I	Use Launa oil or equivalent.
Gears	I	I	I	I	Use Grease-501

NOTE 1.
Duplex Tray: Clutch Spring

Do the following every 120K.

Clean the clutch assembly [A]. Then lubricate the clutch spring with Mobil Temp 78.



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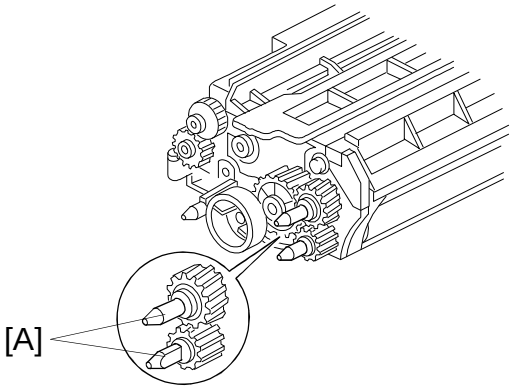
NOTE: 2.
Development Unit: Rear Sleeve
Do the following every 120K.
Clean the rear sleeve [A] with a dry cloth.



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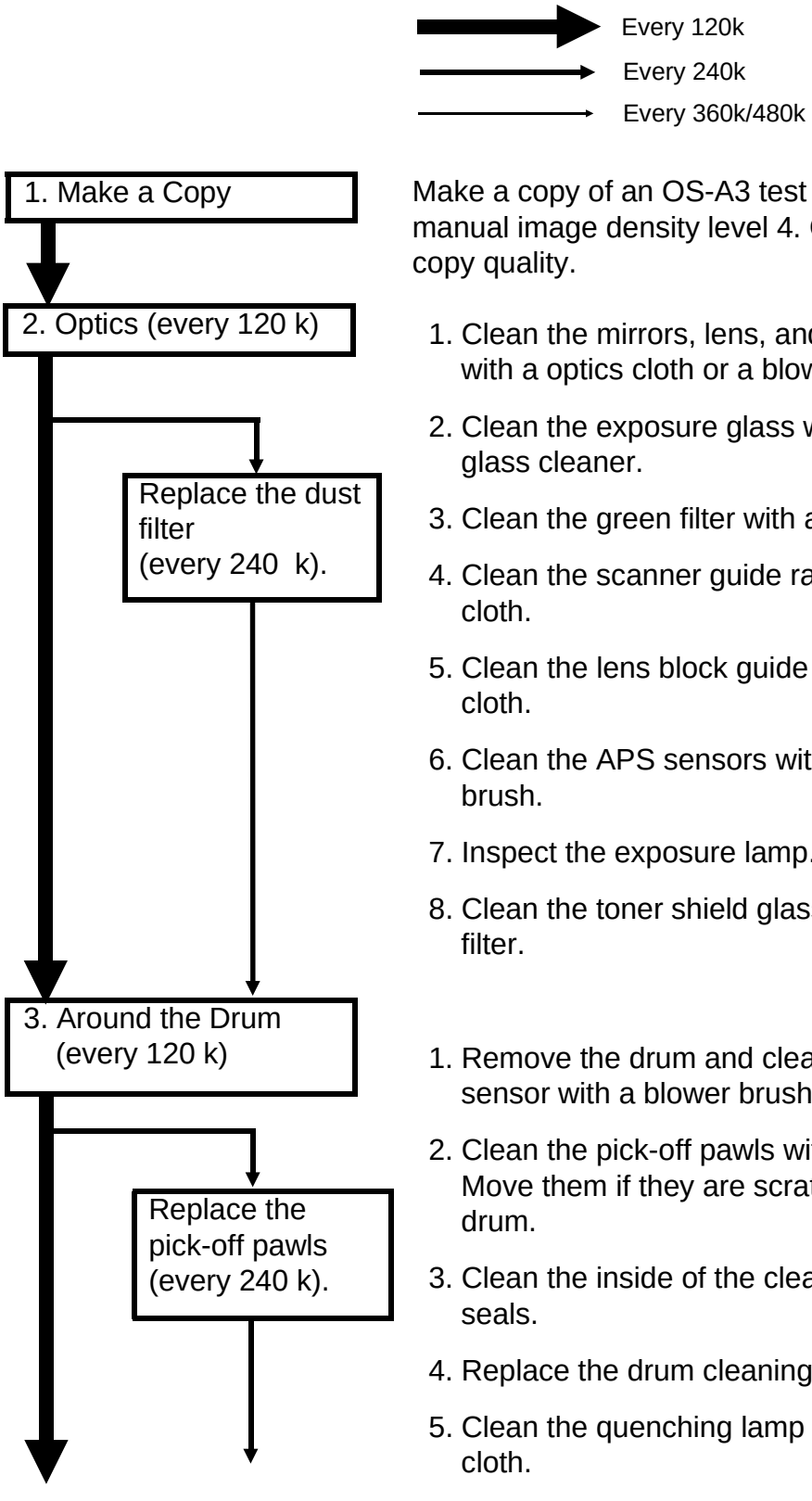
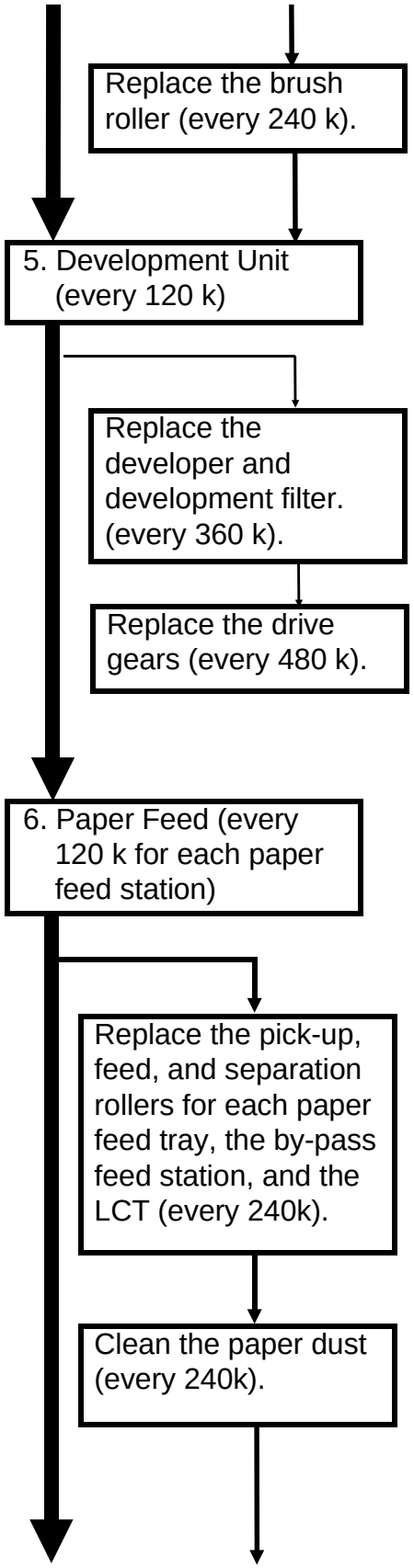
5.2 REGULAR PM PROCEDURE


Every 120k
Every 240k
Every 360k/480k
1. Make a Copy
2. Optics (every 120 k)
Replace the dust filter (every 240 k).
3. Around the Drum (every 120 k)
Replace the pick-off pawls (every 240 k).

Make a copy of an OS-A3 test chart at manual image density level 4. Check the copy quality.

1. Clean the mirrors, lens, and reflectors with a optics cloth or a blower brush.
2. Clean the exposure glass with alcohol or glass cleaner.
3. Clean the green filter with a dry cloth.
4. Clean the scanner guide rail with a dry cloth.
5. Clean the lens block guide rail with a dry cloth.
6. Clean the APS sensors with a blower brush.
7. Inspect the exposure lamp.
8. Clean the toner shield glass and the dust filter.

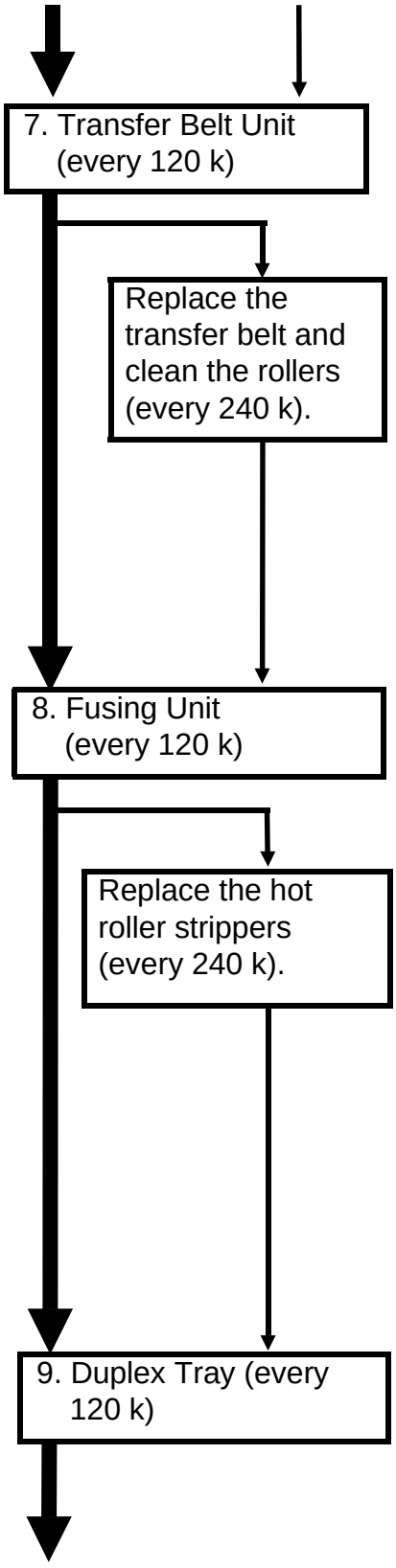
1. Remove the drum and clean the ID sensor with a blower brush or dry cloth.
2. Clean the pick-off pawls with a dry cloth. Move them if they are scratching the drum.
3. Clean the inside of the cleaning unit and seals.
4. Replace the drum cleaning blade.
5. Clean the quenching lamp with a dry cloth.
6. Put back the drum.


Replace the brush roller (every 240 k).
5. Development Unit (every 120 k)
Replace the developer and development filter. (every 360 k).
Replace the drive gears (every 480 k).
6. Paper Feed (every 120 k for each paper feed station)
Replace the pick-up, feed, and separation rollers for each paper feed tray, the by-pass feed station, and the LCT (every 240k).
Clean the paper dust (every 240k).

7. Replace the charge grid and corona wires.
8. Clean the end blocks and casing.

1. Remove the toner supply unit.
2. Clean the development filter.
3. Inspect the seals
4. Clean around the openings of the toner supply unit with a blower brush.
5. Put back the development filter and toner supply unit.
6. Inspect the mold gear and development drive gears.
7. Clean the rear sleeve with a dry cloth.

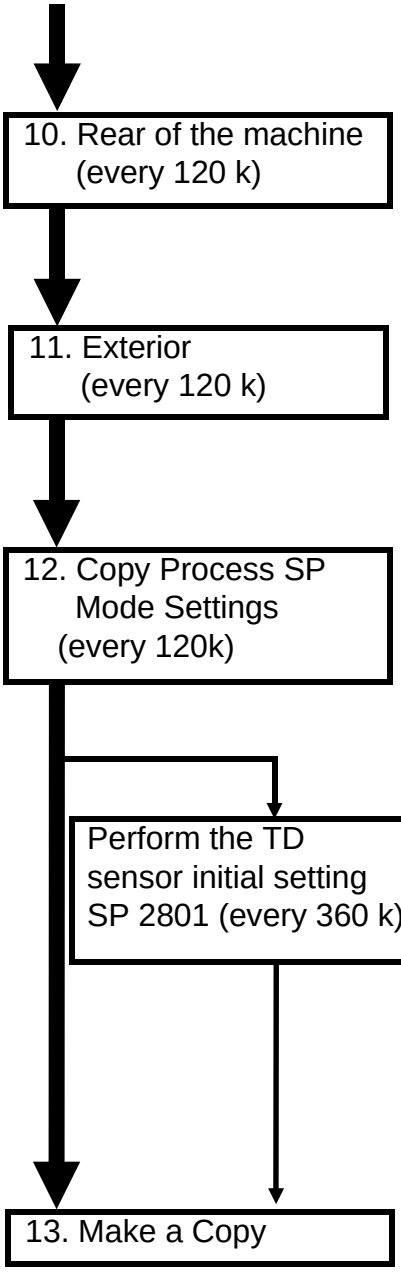
1. Clean the paper guide plate.
2. Clean the paper feed, pick-up, separation, and relay rollers for each paper feed tray, the by-pass feed station, and the LCT.
3. Replace the bottom plate pad for each paper feed tray, the by-pass feed station, and the LCT.
4. Clean the registration rollers.
5. Inspect the registration sensor.


7. Transfer Belt Unit (every 120 k)
Replace the transfer belt and clean the rollers (every 240 k).
8. Fusing Unit (every 120 k)
Replace the hot roller strippers (every 240 k).
9. Duplex Tray (every 120 k)

1. Remove the transfer belt.
2. Empty the used toner tank.
3. Replace the transfer belt cleaning blade.
4. Inspect the transfer belt and rollers.
5. Clean the transfer entrance guide plate and transfer guide plate.

1. Clean the entrance and exit guide plates
2. Inspect the thermistor, fusing lamp, hot and pressure roller bearings, antistatic brush, and cleaning roller bushings.
3. Clean the cleaning roller and cleaning roller bushings.
4. Replace the pressure roller, hot roller, and hot roller bushings.
5. Replace the hot roller strippers.

1. Inspect the mylars.
2. Replace the feed roller and the bottom plate pad.
3. Lubricate the clutch spring with Mobil Temp 78.



1. Inspect the timing belts.

1. Clean the covers.

Perform the ID Sensor Initial Setting (SP3001).

Make a copy of an OS-A3 test chart at manual image density level 4. Check the copy quality.

6. SPECIAL TOOLS AND LUBRICANTS

6.1 SPECIAL TOOLS AND LUBRICANTS

Part Number	Description	Q'ty
A006 9104	Scanner Positioning Pin (4 pcs/set)	1
5420 9516	Test Chart - OS-A3 (10 pcs/set)	1
5447 9078	Heat Resistant Grease - MT-78	1
5203 9501	Silicone Grease G-501	1
5420 9507	Digital Multimeter	1

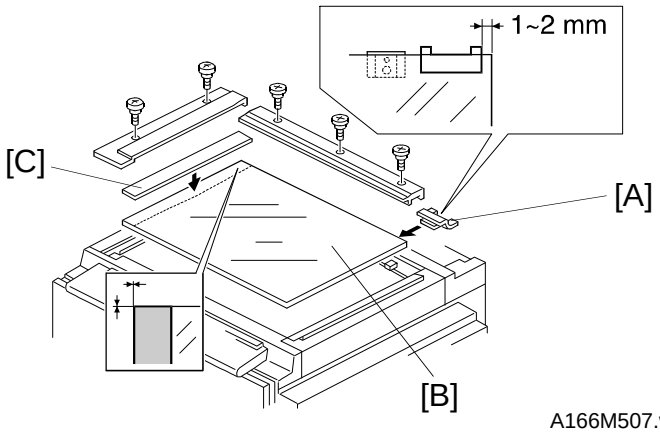
6.2 SPECIAL PARTS

Part Number	Description	Q'ty
A1349011 (Note 1)	Charge Corona Unit with Cleaner	1
A1309005 (Note 2)	Exposure Glass with Electric Conductor Coating	1
A1309006 (Note 2)	Grounding Plate - Exposure Glass	1
AC060002 (Note 2)	White Plate	1

NOTE 1: This special part is used for machines which produce a high copy volume.

NOTE 2: These special parts are used when many original jams occur on the exposure glass using the ADF in low humidity conditions.

The installation procedure is as follows.
1. Remove the exposure glass.
2. Install the grounding plate [A] as shown.
3. Install the new exposure glass [B].
   Note: The red mark should be placed at the rear left corner.
4. Stick the white plate [C] on the exposure glass as shown.
5. Reinstall the scales.



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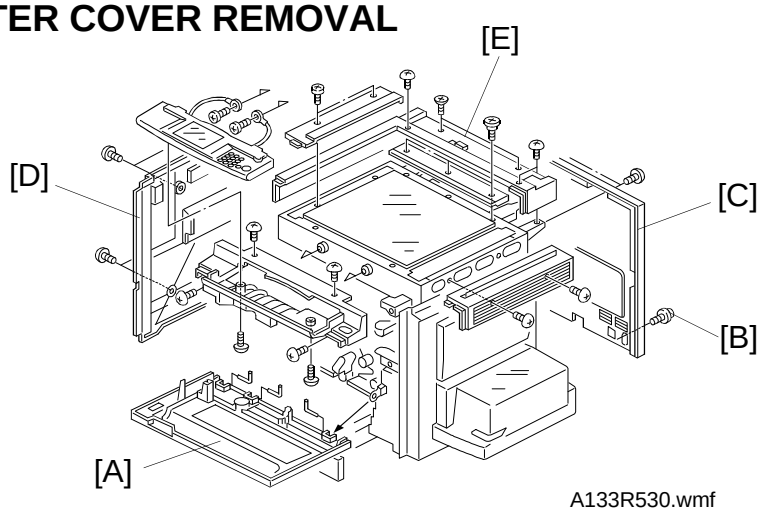
Service Tables

SECTION 5

REPLACEMENT AND ADJUSTMENT

1. INNER AND OUTER COVERS

1.1 OUTER COVER REMOVAL



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1.1.1 Front Cover

1. Open the front cover.
2. Remove the front cover [A] (3 pins).

1.1.2 Rear Cover

1. Loosen the 2 screws for the lower holes [B].
2. Remove the rear cover [C] (7 screws).

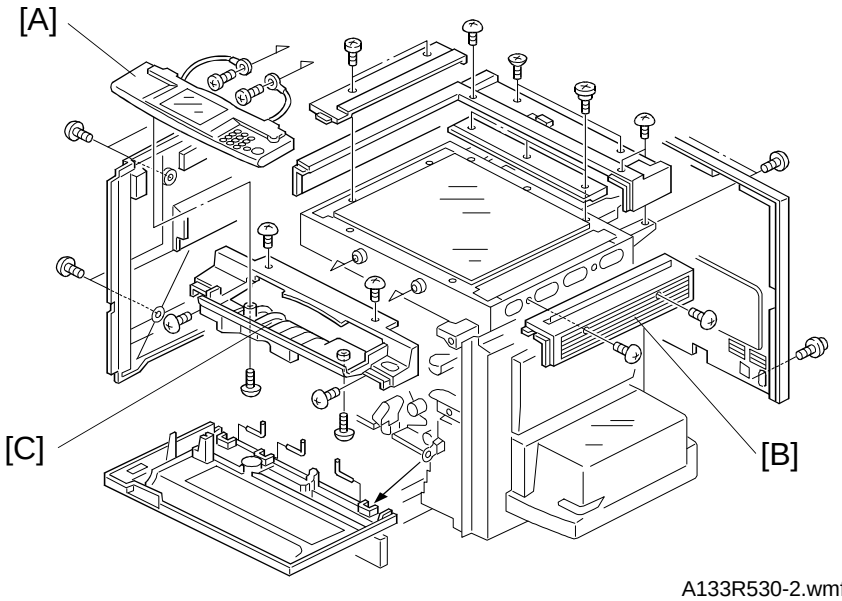
1.1.3 Left Cover

1. Remove the optional 500-sheet tray or finisher.
2. Open the front cover.
3. Slide out the duplex and paper feed trays.
4. Remove the left cover [D] (4 screws).

1.1.4 Top Cover

1. Remove the platen cover (see the Installation procedure) or DF (see the manual for the DF).
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Remove the top cover [E] (5 screws).

1.1.5 Operation Panel



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1. Turn off the main switch and unplug the machine.
2. Open the front cover.
3. Swing out the toner bottle holder assembly.
4. Remove the operation panel [A] (4 screws, 3 connectors).

1.1.6 Right Upper Cover

1. Remove the right upper cover [B] (2 screws).

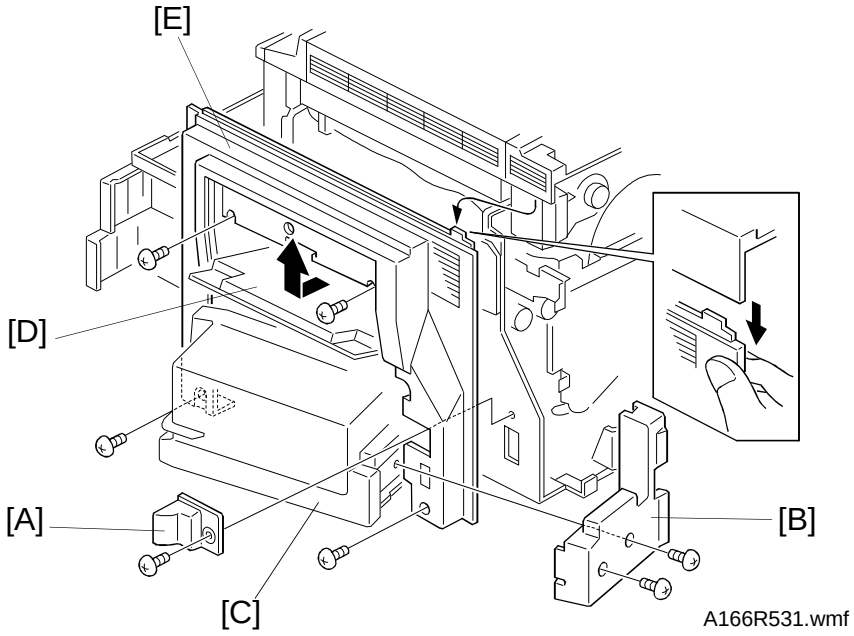
1.1.7 Front Upper Cover

1. Open the front cover.
2. Remove the toner bottle holder assembly. (See Development Unit Removal.)
3. Remove the operation panel [A] (6 screws, 3 connectors).

4 Remove the left inner cover. (See Inner Cover Removal.)

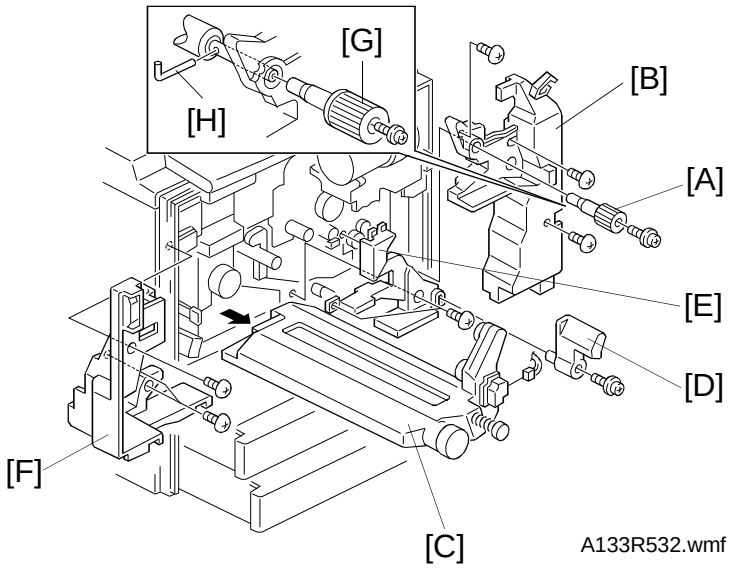
5.Remove the front upper cover [C] (2 screws).

1.1.8 Right Cover



1. Open the front cover and pull out the paper tray and duplex.
2. Remove the LCT harness cover [A] (1 screw).
3. Remove the LCT rear cover [B] (2 screws).
4. Swing open the LCT [C] and open the by-pass feed table [D].
5. Remove the right cover [E] (4 screws).

1.2 INNER COVER REMOVAL



1.2.1 Right Inner Cover

1. Remove the front cover. (See Outer Cover Removal.)
2. Pull out the paper trays.
3. Remove the "A2" knob [A] (1 screw).
4. Remove the right inner cover [B] (3 screws).

NOTE: When removing the knob [G], insert an allen key [H] into the hole in the registration roller shaft as shown in the illustration.

1.2.2 Middle Inner Cover

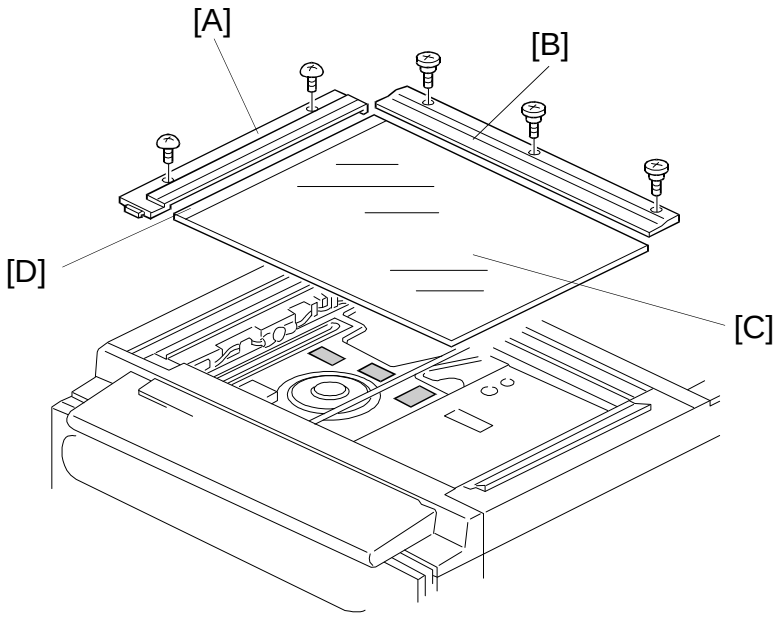
1. Open the front cover and pull out the paper trays.
2. Remove the toner collection bottle [C] (1 connector).
3. Remove the "A1" lever [D] (1 screw).
4. Remove the middle inner cover [E] (2 screws).

1.2.3 Left Inner Cover

1. Remove the front cover. (See Outer Cover Removal.)
2. Remove the toner collection bottle [C] (1 connector).
3. Remove the left inner cover [F] (3 screws).

2. SCANNER

2.1 EXPOSURE GLASS REMOVAL



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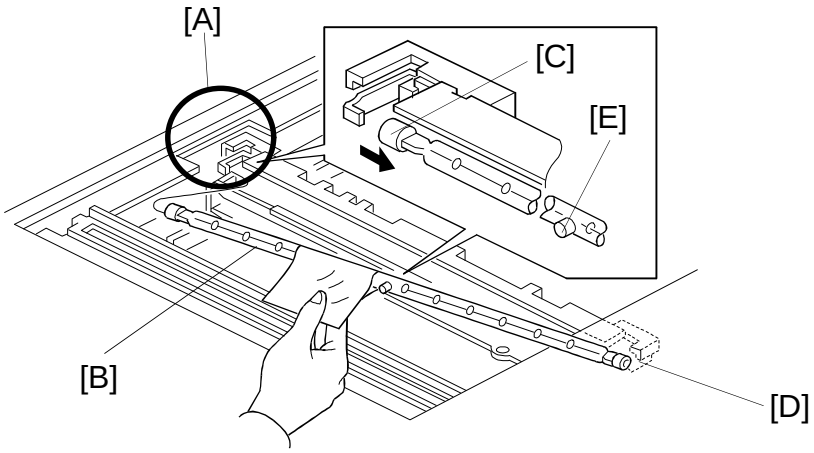
1. Turn off the main switch and unplug the machine.
2. Remove the left scale [A] (2 shoulder screws).
3. Remove the rear scale [B] (3 shoulder screws).
4. Remove the exposure glass [C].

NOTE: 1) Do not touch the exposure glass with dirty bare hands.

2) When installing the exposure glass, make sure that the white reference plate [D] is facing down.

2.2 EXPOSURE LAMP REPLACEMENT



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NOTE: Do not touch the reflector or the new exposure lamp with your bare hands. Use a strip of paper as shown. (Oil marks on the edges of the lamps or reflectors will be affected by heat from the lamp and will cause discoloration.)

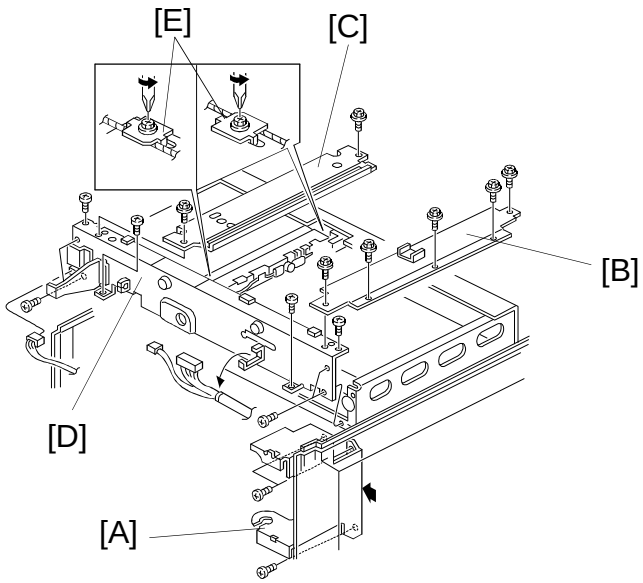
1. Turn off the main switch and unplug the machine.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Move the 1st scanner to the rear cutout position [A].
4. Place a strip of paper around the exposure lamp [B].
4. Release the exposure lamp by holding the lamp tab [C] and pushing it towards the front.

   NOTE: Push the lamp tab very gently or the front terminal will be damaged.
5. Remove the exposure lamp.
6. Install a new lamp. Use a strip of paper to hold the lamp. Set the front terminal [D] first.

NOTE: 1) Make sure that the exposure lamp is properly positioned at the front and rear terminals.
2) Make sure that the glass bump [E] on the exposure lamp is away from the reflector.

2.3 SCANNER WIRE REPLACEMENT

2.3.1 Front Scanner Wire Replacement



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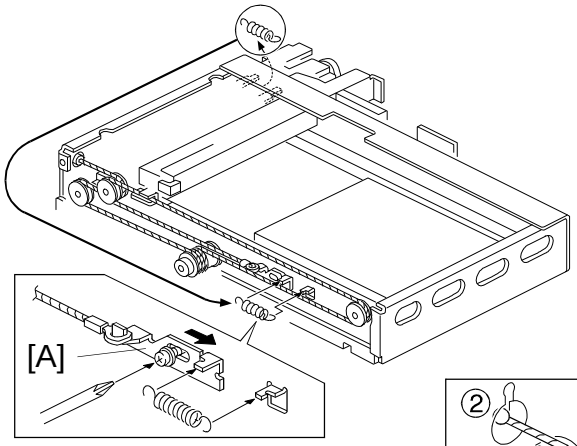
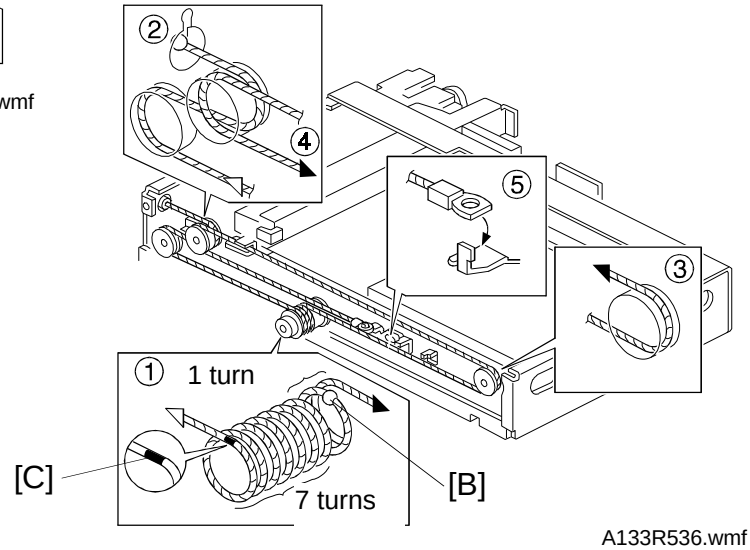
1. Turn off the main switch and unplug the machine.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Remove the top, right upper, and front covers. (See Outer Cover Removal.)
4. Remove the right and left inner covers. (See Inner Cover Removal.)
5. Remove the toner bottle holder assembly. (See Development Unit Removal.)

   NOTE: Close the shutter of the toner bottle unit.
6. Remove the operation panel assembly. (See Outer Cover Removal.)
7. Remove the front upper cover. (See Outer Cover Removal.)
8. Remove the toner bottle holder bracket [A].
9. Remove the upper right stay [B] (5 screws) and the upper left stay [C] (2 screws).
10. Remove the scanner home position sensor. (See Scanner Home Position Sensor Replacement.)
11. Remove the front frame of the scanner unit [D] (9 screws).
12. Release the front and rear wire clamps [E] of the 1st scanner (1 screw each).



A133R535.wmf

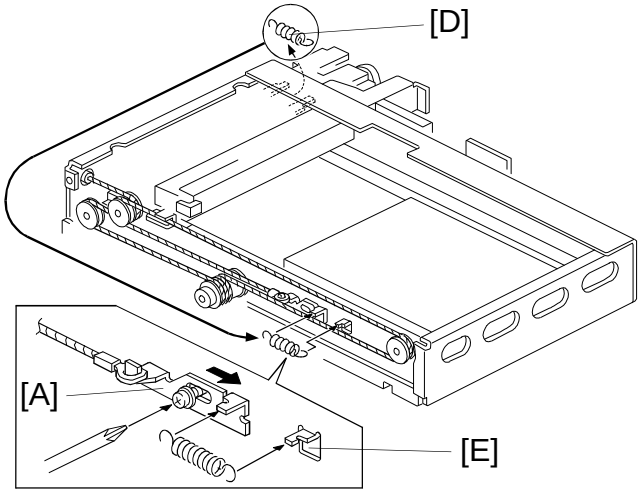


A133R536.wmf

13. Loosen the tension bracket [A].
14. Remove the old scanner wire.
15. Move the 1st scanner to the home position.
16. Put the center ball of the scanner wire [B] into the hole in the scanner drive pulley.

    NOTE: The orientation of the scanner wire must be as follows:
    Left end of the scanner wire → ball.
    Right end of the scanner wire → hook.
17. Wind the right side of the wire counterclockwise towards the rear side (1 turn) and the left side of the wire counterclockwise towards the front (7 turns) as shown.

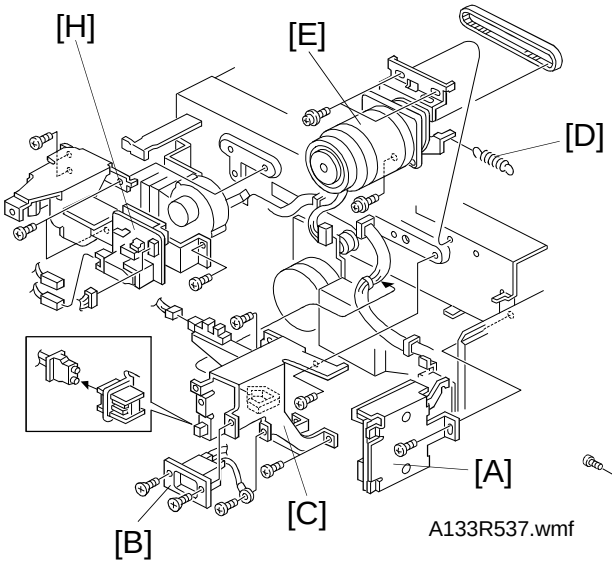
    NOTE: The mark [C] on the wire will come to the position shown.
18. Run the scanner wire as shown.



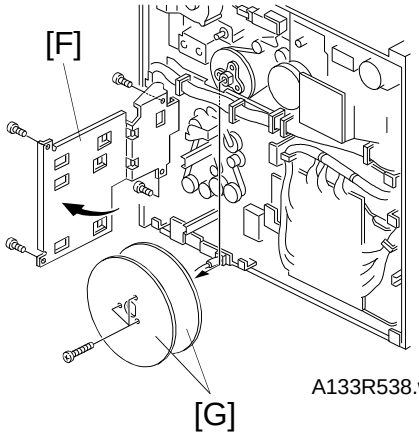
A133R535-2.wmf

19. Secure the tension bracket [A] temporarily.
20. Remove the tension spring [D] of the scanner motor.
21. Hook the spring onto the tension bracket and spring hook [E].
22. Loosen the screw of the tension bracket and tighten it again.
23. Put the tension spring back on the scanner motor.
24. Adjust the scanner position. (See Scanner Position Adjustment.)
25. Do the copy image adjustments in section 12. (Check the printer settings first, then adjust the scanner registration and the sub-scan magnification.)

2.3.2 Rear Scanner Wire Replacement

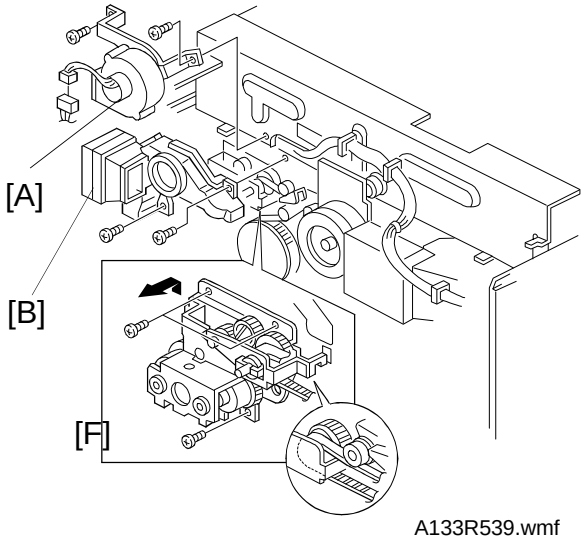


A133R537.wmf

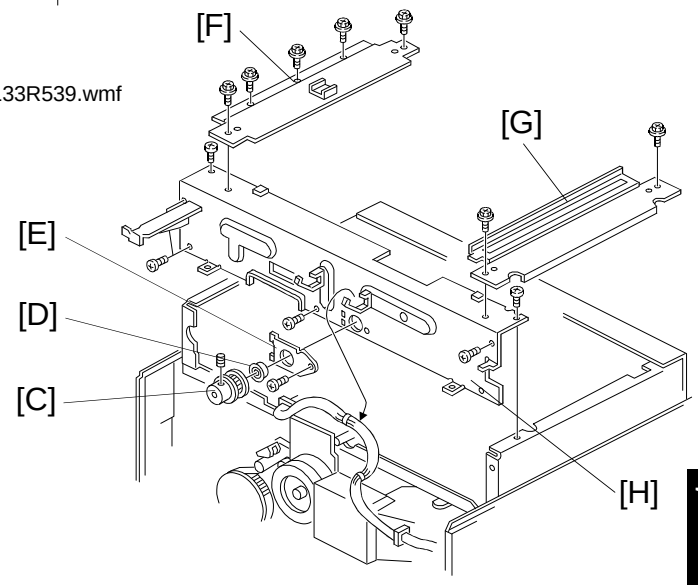


A133R538.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Remove the top, right upper, and rear covers. (See Outer Cover Removal.)
4. Remove the scanner drive board [A] (3 connectors, 1 screw).
5. Remove the DF connector [B] (2 screws, 1 grounding wire).
6. Remove the left DF bracket [C] (4 screws, 1 connector).
7. Remove the tension spring [D].
8. Remove the scanner motor [E] (3 screws) and its grounding wire (1 screw).
9. Remove the HDD unit. (See HDD Unit Replacement.)
10. Swing out the SCU board plate [F] (4 screws).
11. Remove the fly wheels [G] (3 screws).
12. Remove the right DF bracket and the charge high voltage supply board assembly [H] (5 screws, 2 connectors).

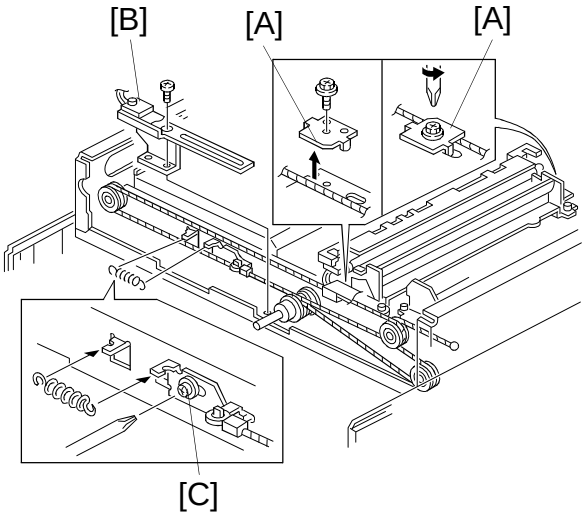


A133R539.wmf

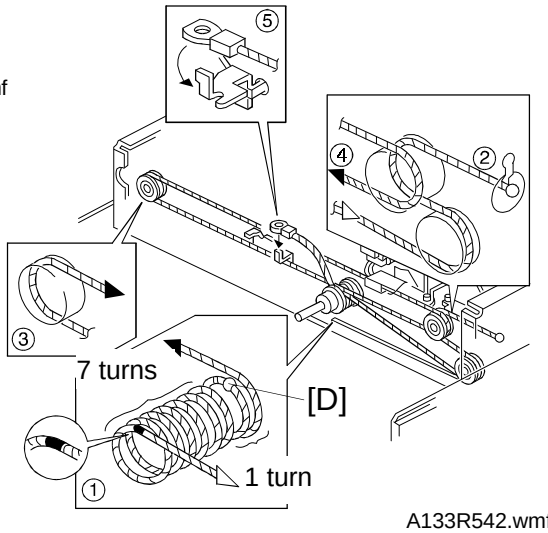


A133R540.wmf

13. Remove the development drive clutch holder and the development drive clutch assembly. (See Development Drive Clutch and Toner Supply Clutch Replacement.)
14. Remove the ozone fan motor [A] (1 connector, 2 screws).
15. Remove the ozone fan motor duct [B] (2 screws).
16. Remove the scanner drive gear [C] (1 allen screw).
17. Remove the bushing [D] and holding bracket [E] (1 screw).
18. Remove the upper right stay [F] (5 screws) and the upper left stay [G] (2 screws).
19. Remove the rear frame of the scanner unit [H] (9 screws).



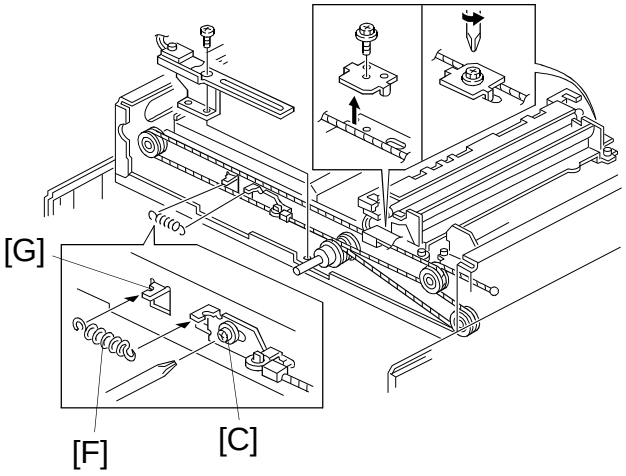
A133R541.wmf



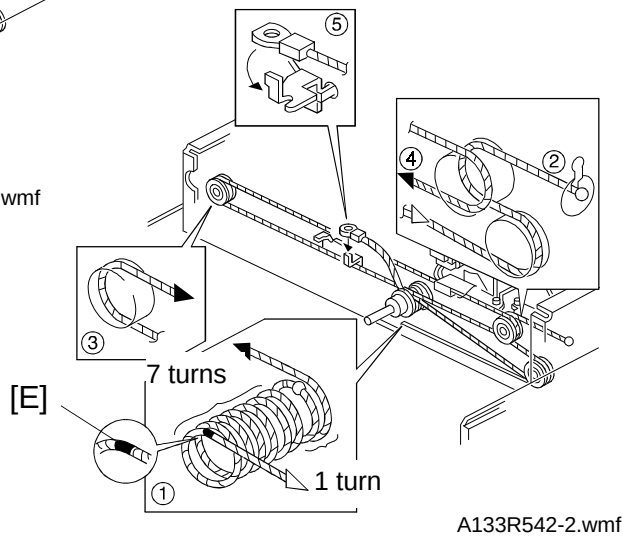
A133R542.wmf

20. Release the rear and front wire clamps [A] of the 1st scanner (1 screw each).
21. Remove the terminal [B] of the flat cable (1 screw).
22. Loosen the tension bracket [C] and remove the old scanner wire.
23. Remove the old scanner wire.
24. Move the 1st scanner to the home position.
25. Put the center ball of the scanner wire [D] into the hole in the scanner drive pulley.

    NOTE: The orientation of the scanner wire must be as follows:
    Right end of the scanner wire → ball.
    Left end of the scanner wire → hook.



A133R541-2.wmf



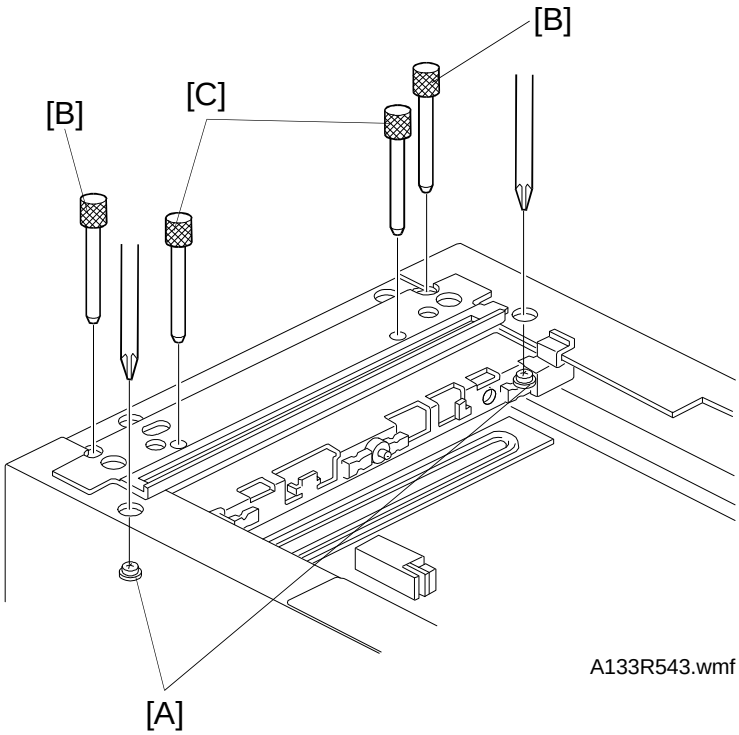
A133R542-2.wmf

26. Wind the left side of the wire counterclockwise towards the front side (1 turn) and the right side of the wire counterclockwise towards the rear (7 turns) as shown.

    NOTE: The mark [E] on the wire will come to the position shown.

27. Run the scanner wire as shown.
28. Secure the tension bracket [C] temporarily.
29. Remove the tension spring [F] of the scanner motor.
30. Hook the spring onto the tension bracket and spring hook [G].
31. Loosen the screw of the tension bracket [C] and tighten it again.
32. Put the tension spring back on the scanner motor.
33. Adjust the scanner position. (See Scanner Position Adjustment.)
34. Do the copy image adjustments in section 12. (Check the printer settings first, then adjust the scanner registration and the sub-scan magnification.)

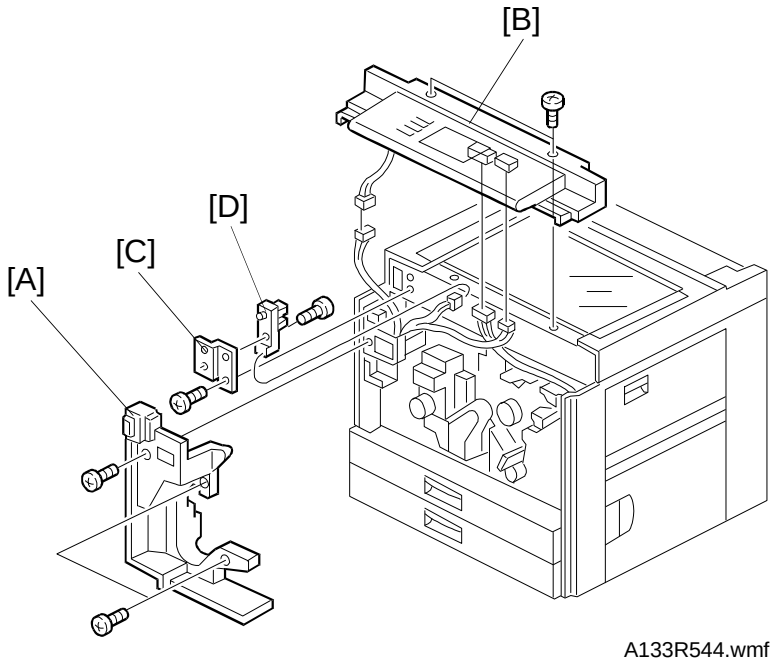
2.3.3 Scanner Position Adjustment



1. Move the 1st scanner to the home position.
2. If the scanner wire clamp screws [A] are not loose already, loosen them now.
3. Secure the 1st scanner with two pins [B] and the 2nd scanner with two pins [C].

   NOTE: The four pins should drop in smoothly.
4. Secure the 1st scanner wire clamps [C] (1 screw each).
5. Take out the 4 pins.
6. Run the scanner with the scanner free run mode (SP4013) and check the scanner position using the 4 pins (repeat steps 1 and 2).

2.4 SCANNER HOME POSITION SENSOR REPLACEMENT



A133R544.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the toner bottle holder assembly. (See Development Unit Removal.)

   NOTE : Close the shutter of the toner collection bottle holder.
3. Remove the left inner cover [A] (3 screws).
4. Remove the operation panel assembly [B]. (See Outer Cover Removal.)
5. Remove the home position sensor bracket [C] (1 connector, 1 screw).
6. Replace the home position sensor [D] (1 screw).

2.5 SCANNER DRIVE MOTOR

See steps 1 to 8 of Rear Scanner Wire Replacement.

After replacing the motor, do the copy image adjustments in section 12. (Check the printer settings first, then adjust the scanner registration and the sub-scan magnification.)

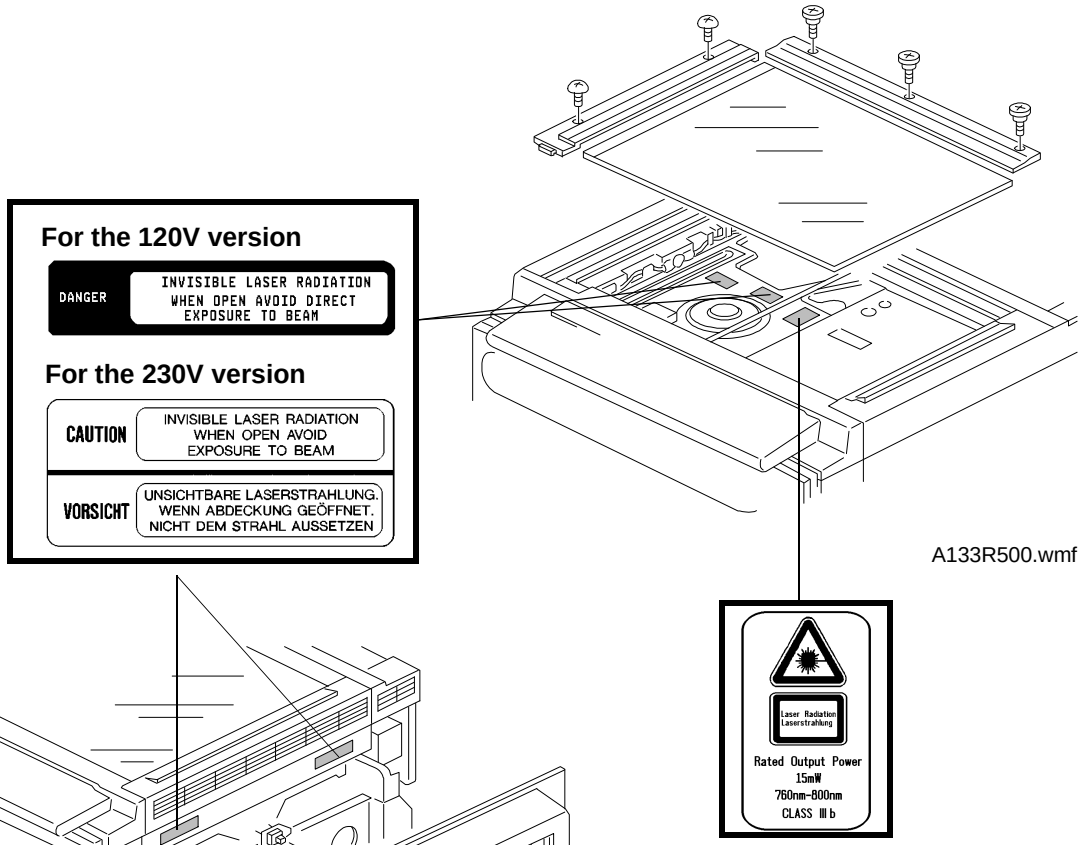
3. LASER EXPOSURE

⚠ WARNING

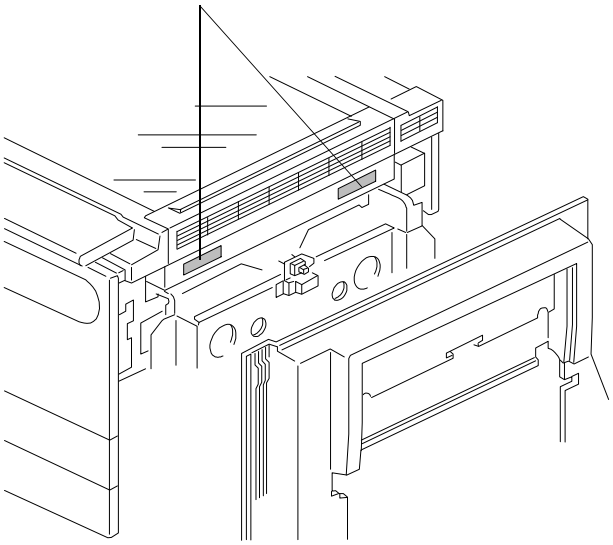
Turn off the main switch and unplug the machine before attempting any of the procedures in this section. Laser beams can seriously damage your eyes.

- CAUTION DECALS -

Five caution decals are located in the laser section, as shown.

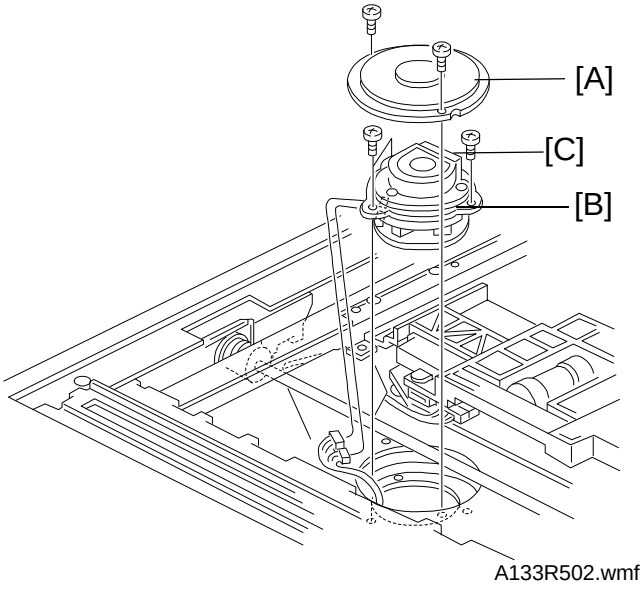


A133R500.wmf



A133R501.wmf

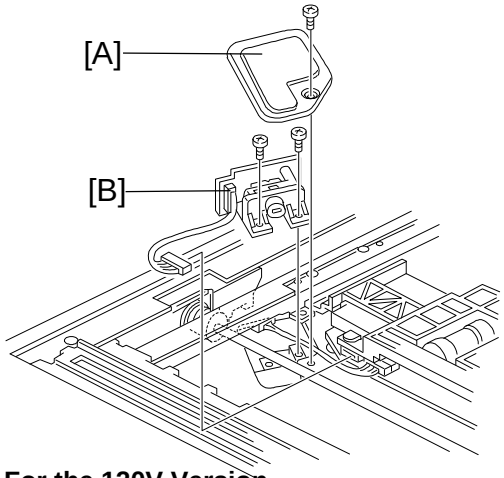
3.1 POLYGON MIRROR MOTOR REPLACEMENT



1. Turn off the main switch and unplug the machine.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Remove the polygon mirror motor cover [A] (2 screws).
4. Remove the polygon mirror motor [B] (3 screws, 2 connectors).

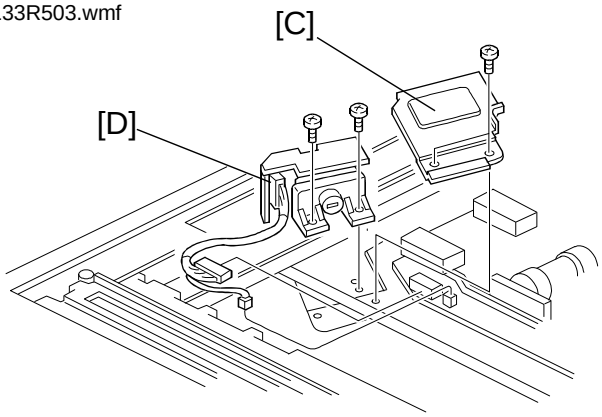
NOTE: 1) Do not touch the shield glass surface [C] on the polygon mirror motor.
2) Do not remove the cover of the polygon mirror. The polygon mirror is very sensitive to dust.
3) After putting back the motor, do the printer and main scan adjustments in section 12.

3.2 LD UNIT REPLACEMENT



For the 120V Version

A133R503.wmf



For the 230 V Version

A133R604.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Remove the SBU cover. (See EX-IPU Replacement.)

– 115 V machine –

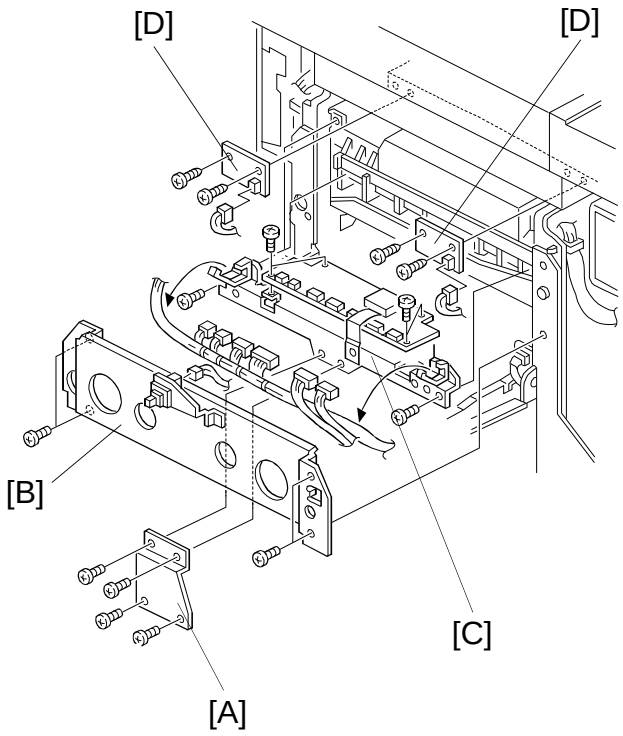
4. Remove the LD unit cover(s) [A] (1 screw).
5. Remove the LD unit [B] (2 screws, 1 connector).

– 230 V machine –

4. Remove the LD unit cover [C] (2 screws).
5. Remove the LD unit [D] (2 screws, 2 connectors)

NOTE: Do not adjust the variable resistors on the LD unit, as they are adjusted in the factory.

3.3 MAIN SCAN SYNCHRONIZATION DETECTOR BOARD REPLACEMENT

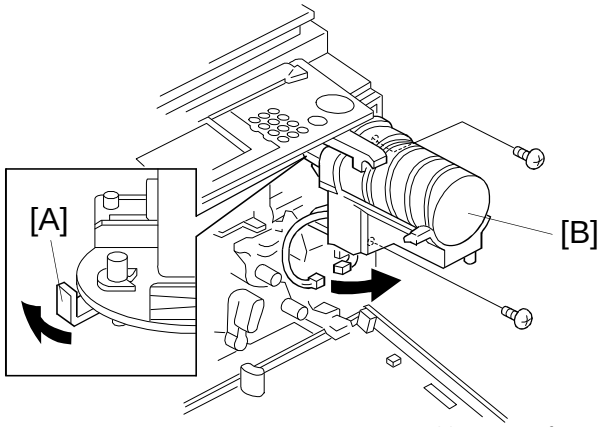


A133R504.wmf

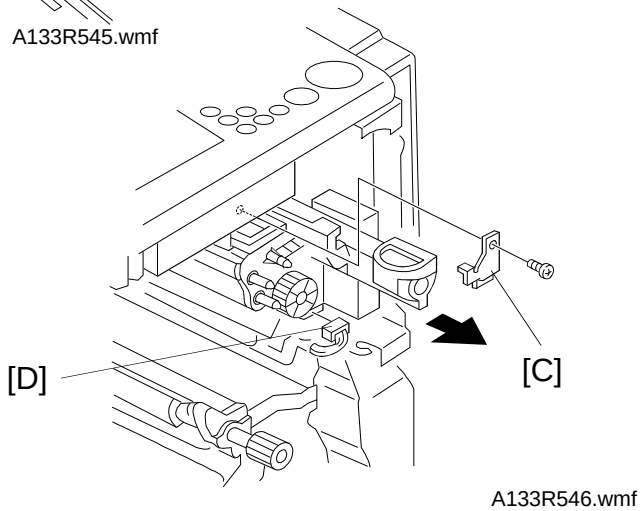
1. Turn off the main switch and unplug the machine.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Remove the right cover. (See Outer Cover Removal.)
4. Remove the lower grounding plated [A] (4 screws).
5. Remove the right stay [B] (4 screws, 1 connector).
6. Disconnect all connectors from the power pack.
7. Slide out the high voltage control board [C] (2 screws).
8. Remove the main scan synchronization detector boards [D] (2 screws each).

4. DEVELOPMENT AND TONER SUPPLY

4.1 DEVELOPMENT UNIT REMOVAL



A133R545.wmf



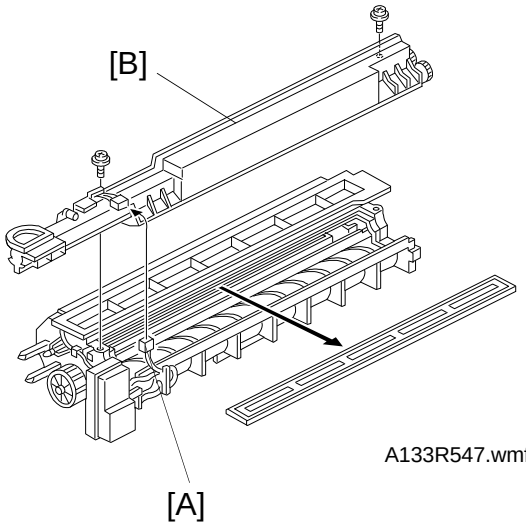
A133R546.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the drum unit. (See Drum Unit Removal.)
3. Push the shutter lever [A] of the toner bottle holder as shown.
4. Remove the toner bottle holder [B] (2 screws, 1 connector).
5. Remove the development unit stopper [C] (1 screw).
6. Disconnect the development unit connector [D].
7. Pull out the development unit.

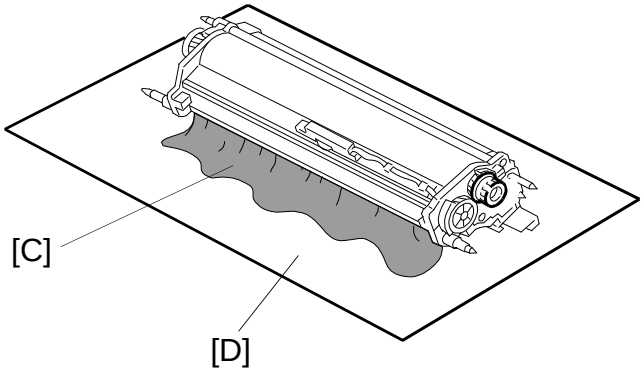
NOTE: Be careful not to nick or scratch the development roller.

If you are temporarily installing a used development unit for test purposes, do SP2220 after installation (see SP 2220 in the SP mode tabe for how to use this SP mode).

4.2 DEVELOPER REPLACEMENT



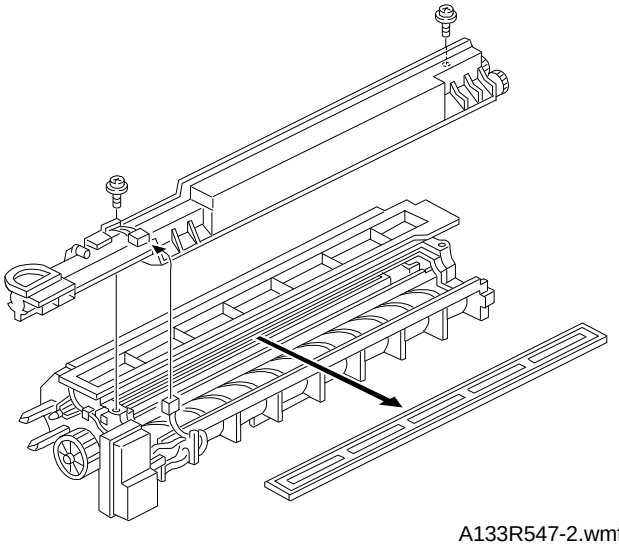
A133R547.wmf



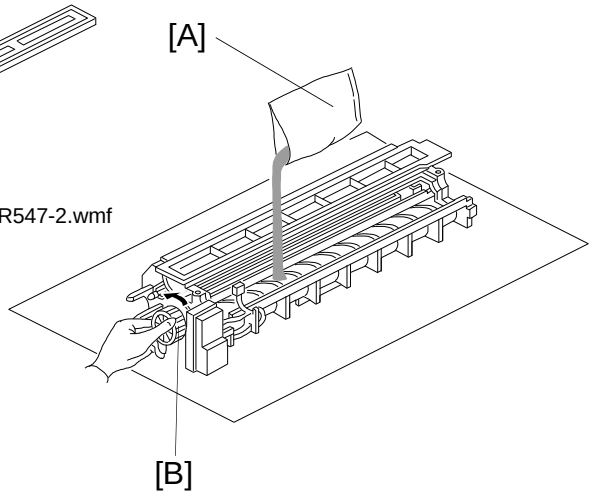
A133R549.wmf

1. Take out the development unit and place it on a clean sheet (see Development Unit Removal).
2. Disconnect the connector [A] and separate the toner supply unit [B] from the development unit (2 screws).
3. Turn over the development unit and empty all the developer [C] onto the paper [D]. Make sure that no developer remains on the development roller or in the unit.

NOTE : 1) Dispose of the used developer in accordance with local regulations.
2) Be careful not to nick or scratch the development roller.



A133R547-2.wmf



A133R548.wmf

4. Pour about half a pack of developer [A] into the development unit. Then rotate counterclockwise the outer knob [B] as shown to distribute the developer evenly. Then pour in all the remaining developer and rotate the gears again.

   NOTE : Do not rotate the gears in the other direction, or developer will spill out.

5. Remount the toner supply unit on the development unit (2 screws) and reconnect the connector.

6. Install the development unit in the copier (1 stopper and 1 connector).

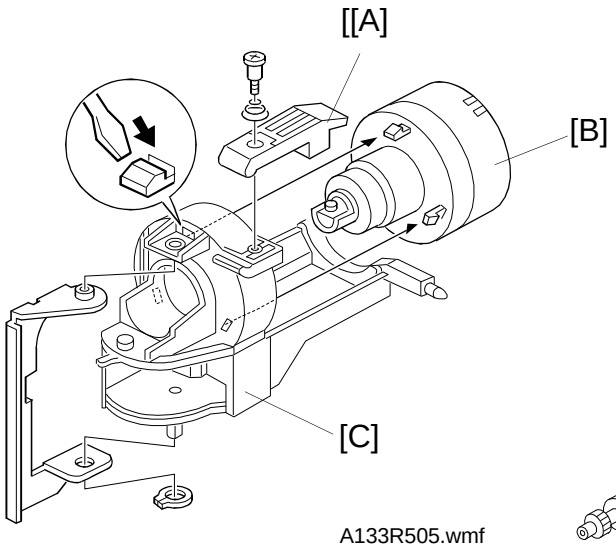
7. Turn on the main switch, make sure that the machine has warmed up, then do the TD sensor initial setting for new developer using SP2801.

   NOTE : Do not perform the TD sensor initial setting before the machine is in the ready condition.

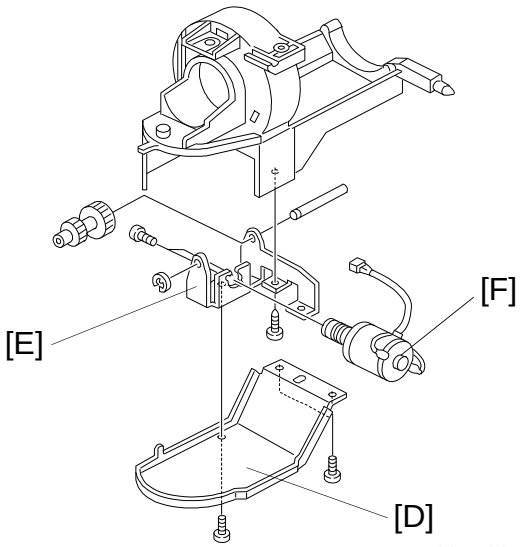
⚠ CAUTION:

Never make a copy with the new developer before completing the TD sensor initial setting (SP2801). Otherwise toner density control will be abnormal.

4.3 TONER SUPPLY MOTOR REPLACEMENT



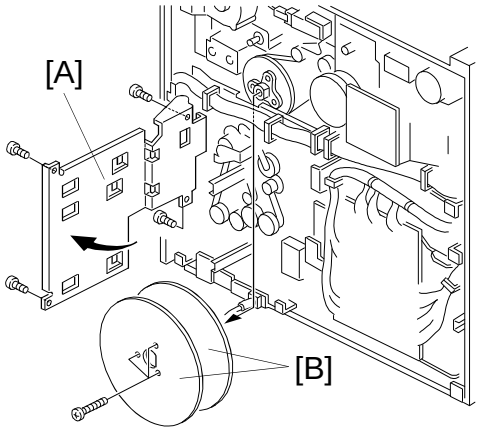
A133R505.wmf



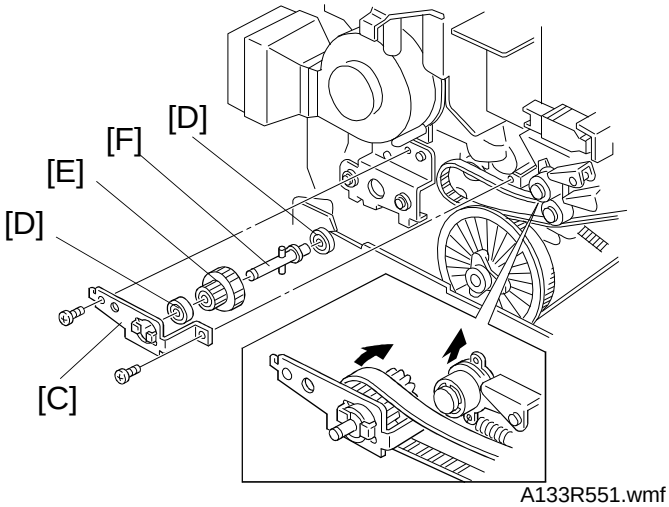
A133R506.wmf

1. Turn off the main switch and unplug the machine.
2. Open the front cover.
3. Swing out the bottle holder and remove the toner bottle.
4. Remove the bottle holder from the copier (2 screws and 1 connector).
5. Remove the bottle locking lever [A] (1 shoulder screw and 1 spring).
6. Remove the bottle rotating cover [B] by releasing the three hooks.
7. Remove the hinge bracket [C] from the bottle holder (1 C-ring).
8. Remove the bottom cover [D] (3 screws).
9. Remove the toner supply motor bracket [E] (1 screw) and replace the toner supply motor [F] (1 E-ring and 1 gear shaft).

4.4 DEVELOPMENT DRIVE CLUTCH AND TONER SUPPLY CLUTCH REPLACEMENT



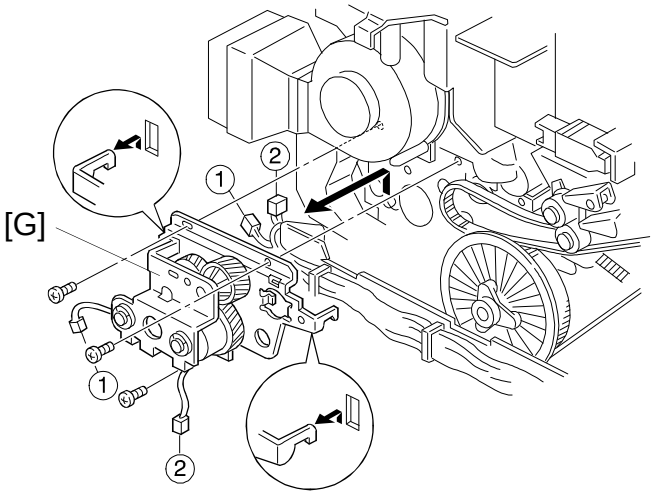
A133R538.wmf



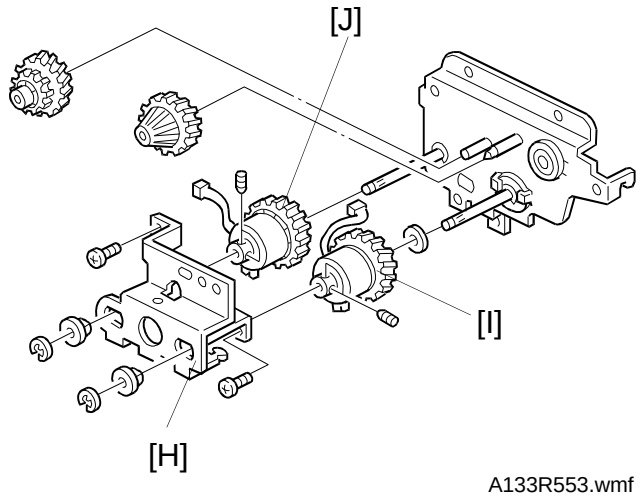
A133R551.wmf

1. Turn off the main switch.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Swing out the SCU board plate [A] (4 screws).
4. Remove the fly wheels [B] (3 screws).
5. Remove the development unit drive gear holder [C] (2 screws).
6. Remove 2 bearings [D], 1 gear [E], and 1 shaft [F].

   NOTE : The bearings drop easily.



A133R552.wmf



A133R553.wmf

7. Remove the clutch assembly [G] (2 connectors, 3 screws).
8. Remove the clutch assembly holder [H] (2 E-rings, 2 bushings, and 2 screws).
9. Replace the development drive clutch [I] or the toner supply clutch [J] (2 Allen screws).

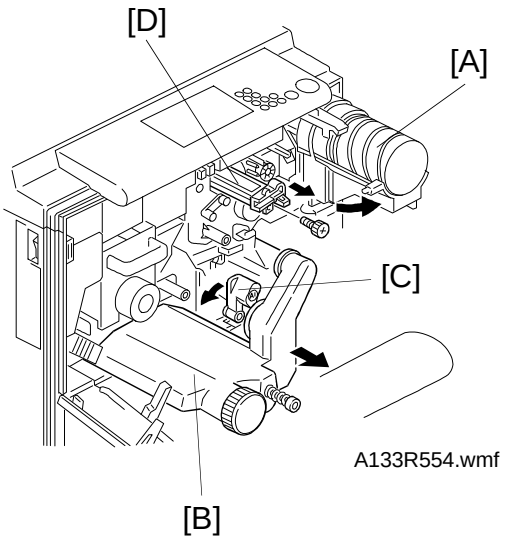
4.5 TD SENSOR REPLACEMENT

After replacing the TD sensor, do the TD sensor initial setting for new developer using SP2801.

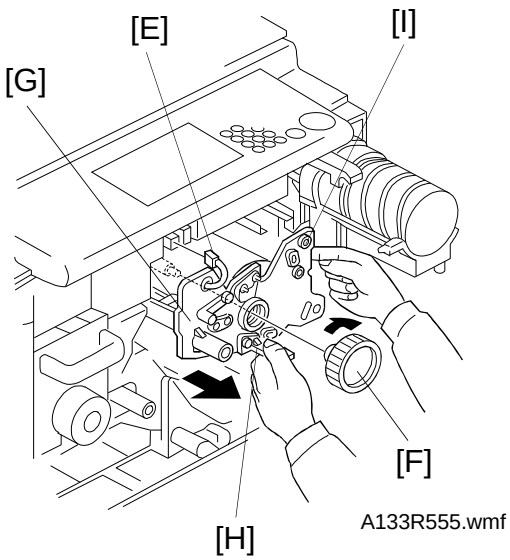
See Developer Replacement for details.

5. AROUND THE DRUM

5.1 DRUM UNIT REMOVAL



A133R554.wmf

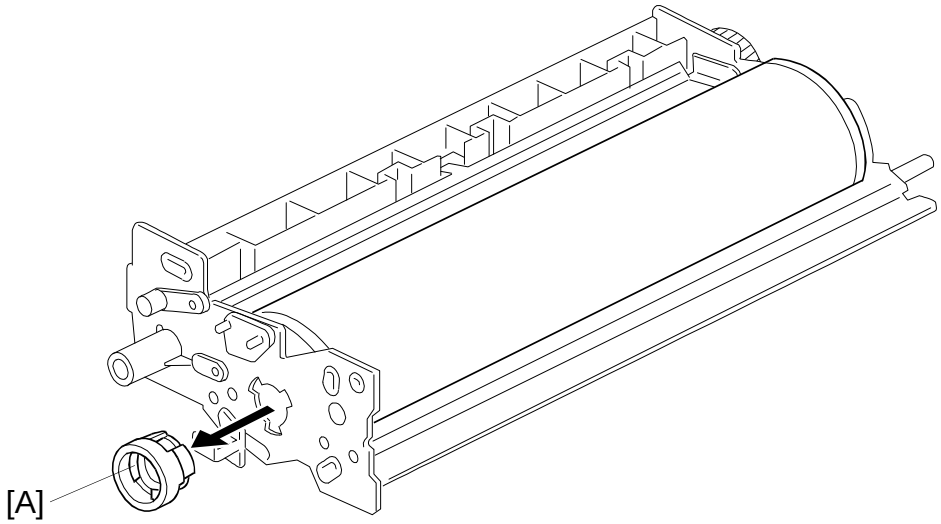


A133R555.wmf

1. Turn off the main switch and unplug the machine.
2. Open the front cover.
3. Swing out the toner bottle holder [A].
4. Remove the toner collection bottle [B] (1 connector).
5. Turn the "A1" lever [C] counterclockwise to lower the transfer belt unit.
6. Pull out the charge corona unit [D] (1 screw).
7. Disconnect the connector [E] of the image density sensor.
8. Turn the drum unit knob [F] clockwise and remove the knob.
9. Pull out the drum unit [G] part of the way out while holding the knob [H] and the upper right corner [I] of the front side plate of the drum unit.
10. Push the development unit to the right after the front side plate of the drum unit is released from the development roller shaft.
11. Pull the drum unit all the way out.

NOTE: 1) Place the drum unit on a clean sheet of paper.
2) Do not touch the drum surface with bare hands.
3) Make sure that the image density sensor connector is connected when you put back the drum.

5.2 DRUM REPLACEMENT

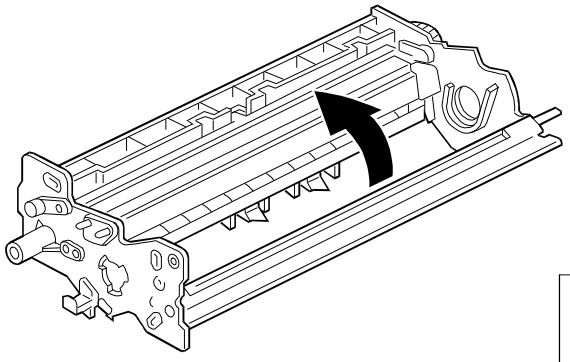


A133R556.wmf

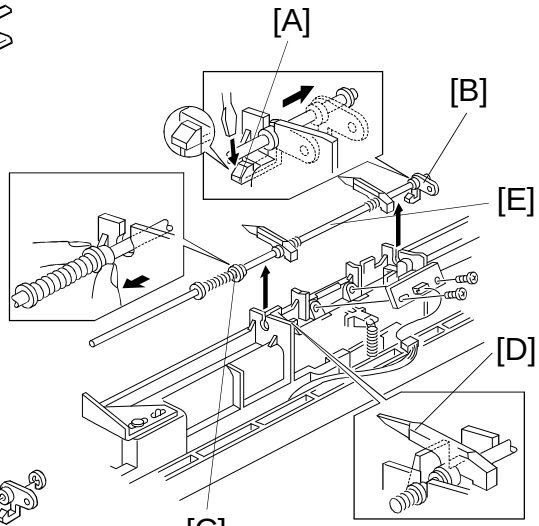
1. Remove the drum unit. (See Drum Unit Removal.)
2. Put the drum unit on a clean sheet of paper. Cover it with another sheet to avoid light fatigue.
3. Remove the front bearing [A].
4. Remove the old drum.
5. Install the new drum.
6. Install the front bearing and remove the protective sheet.
7. Reassemble the machine.
8. Perform the ID sensor initial setting (SP3001).

NOTE: Do not touch the drum surface with bare hands.

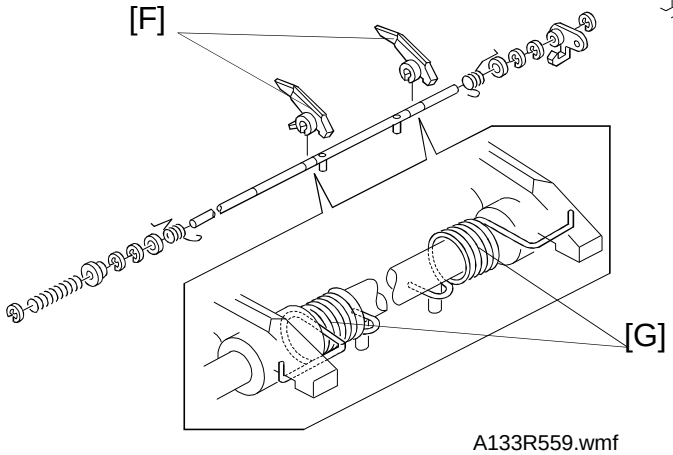
5.3 PICK-OFF PAWL REPLACEMENT



A133R557.wmf



A133R558.wmf



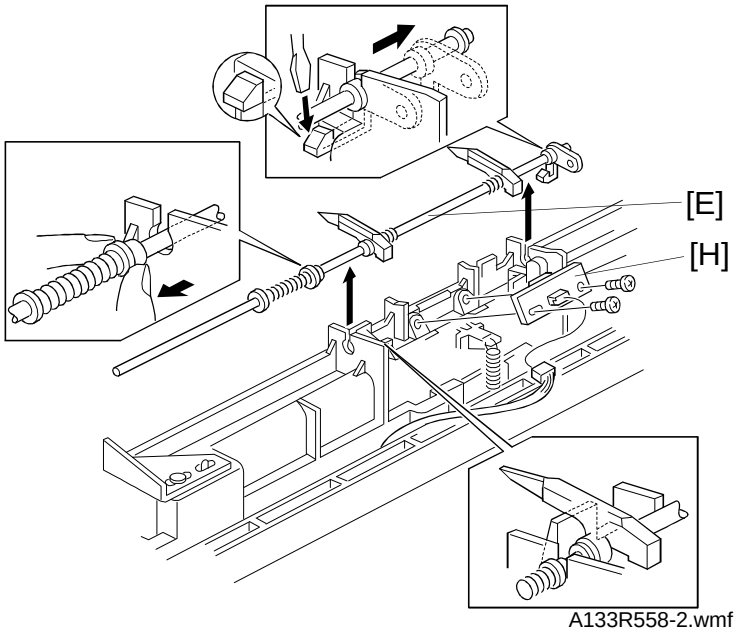
A133R559.wmf

1. Remove the drum. (See Drum Replacement.)
2. Turn the drum unit upside-down.
3. Release the hook [A] and slide the rear bushing [B] to the rear.
4. Slide the front bushing [C] to the front and release it from the bracket.

   NOTE: Be sure that the pawls [D] are positioned as shown when you put them back. Check that they move smoothly.
5. Lift the front side of the pick-off pawl shaft assembly [E] and replace the pick-off pawls [F].

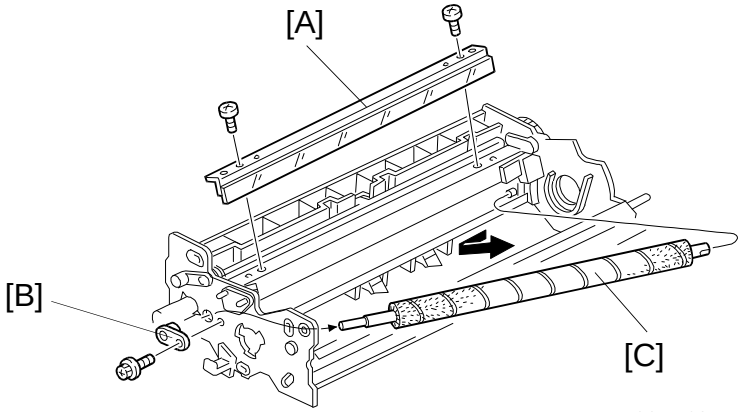
   NOTE: Be sure that the pressure spring [G] is positioned as shown.

5.4 ID SENSOR BOARD REPLACEMENT



A133R558-2.wmf

1. Remove the pick-off pawls. (See Pick-off Pawl Replacement.)
2. Remove the pick-off pawl shaft assembly [E].
4. Replace the ID sensor board [H] (2 screws, 1 connector).
5. Reassemble the machine.
6. Do the ID sensor initial setting procedure (SP3001).



A133R560.wmf

5.5 DRUM CLEANING BLADE REPLACEMENT

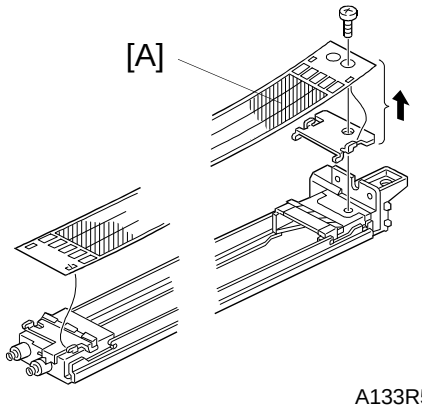
1. Remove the drum. (See Drum Replacement.)
2. Remove the old cleaning blade [A] (2 screws).
3. Install the new cleaning blade.

NOTE: 1) Check that there is no dust on the edge of the new cleaning blade.
2) When installing the new cleaning blade, be sure not to deform the sponge seals at both sides of the cleaning blade holder.

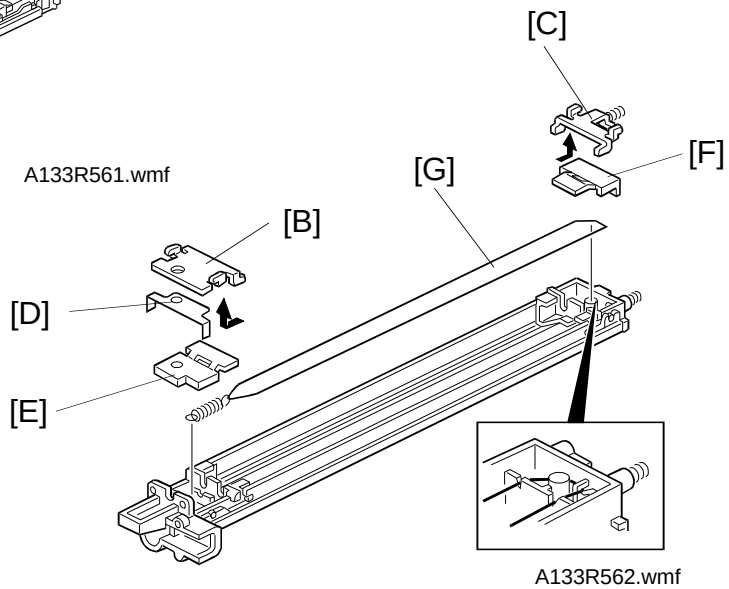
5.6 CLEANING BRUSH REPLACEMENT

1. Remove the drum. (See Drum Replacement.)
2. Remove the cleaning blade [A] (2 screws).
3. Remove the front bushing [B] of the cleaning brush (1 screw).
4. Move the cleaning brush [C] towards the front and release the rear shaft of the cleaning brush from the rear side plate.
5. Remove the old cleaning brush.
6. Install the new cleaning brush.

NOTE: 1) Clean the ID sensor after replacing the cleaning brush if necessary. If you clean the ID sensor, do the ID sensor initial setting procedure afterwards (SP3001).
2) Do not scratch or fold the entrance seal.
3) Do not touch the surface of the cleaning brush with your bare hands.



A133R561.wmf



A133R562.wmf

5.7 CHARGE CORONA GRID PLATE REPLACEMENT

1. Open the front cover.
2. Swing out the bottle holder.
3. Remove the charge corona unit. (See Drum Unit Removal.)
4. Replace the grid plate [A] (1 screw).

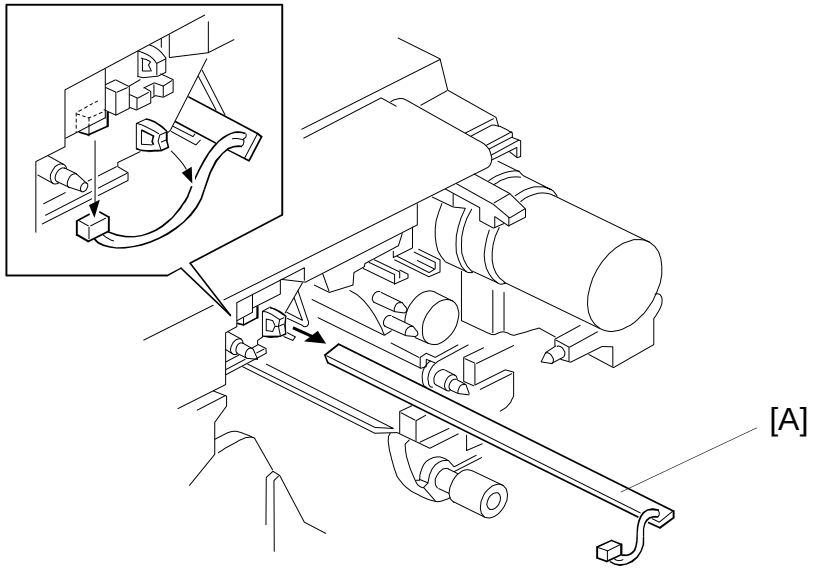
NOTE: Do not touch the grid plate with bare hands. Also, do not bend the grid plate or make any dent in it.

5.8 CORONA WIRE REPLACEMENT

1. Remove the grid plate. (See Grid Plate Replacement.)
2. Remove the front and rear grid plate holders [B, C].
3. Remove the connecting plate [D].
4. Remove the front and rear end block covers [E, F].
5. Replace the corona wire [G].

NOTE: Do not touch the corona wire with bare hands.

5.9 QUENCHING LAMP REPLACEMENT

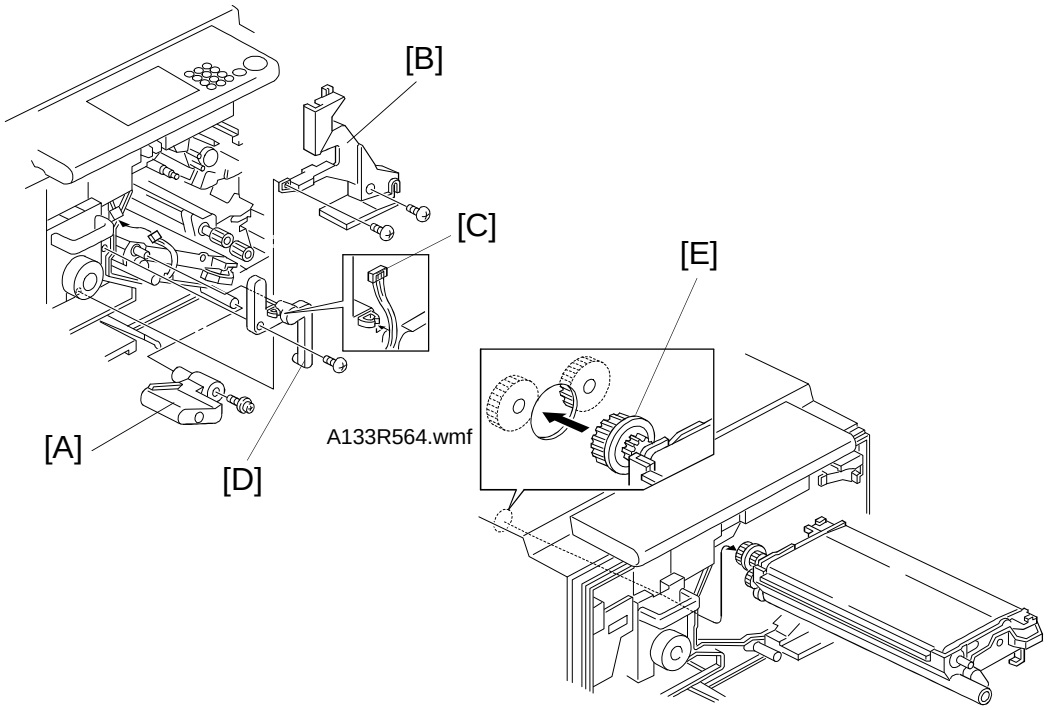


A133R563.wmf

1. Remove the drum unit. (See Drum Unit Removal.)
2. Replace the quenching lamp [A] (1 connector).

6. TRANSFER BELT UNIT

6.1 TRANSFER BELT UNIT REPLACEMENT

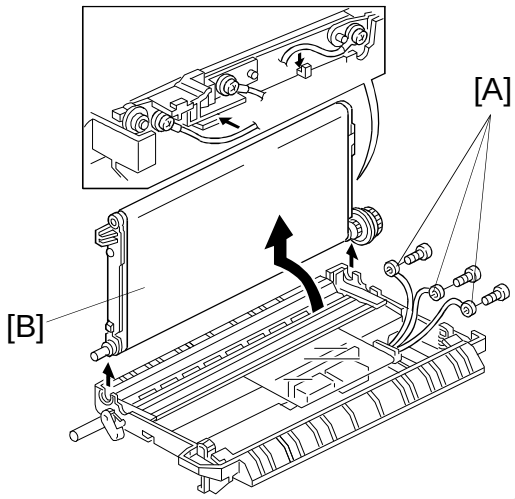


A133R565.wmf

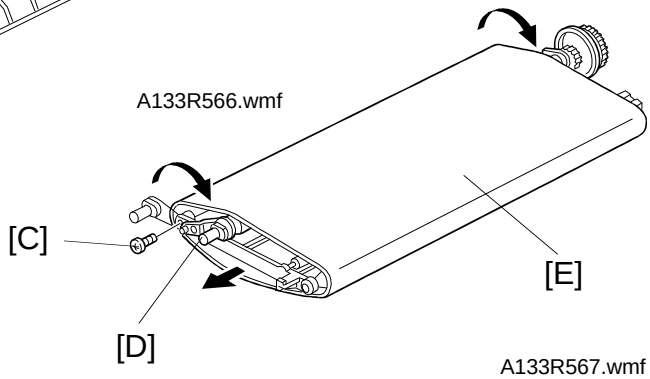
1. Turn off the main switch and unplug the machine.
2. Remove the front cover. (See Outer Cover Removal.)
3. Swing out the toner bottle holder.
4. Turn the "A1" lever counterclockwise to lower the transfer belt unit.
5. Remove the drum unit. (See Drum Unit Removal.)
6. Remove the "A1" lever [A] (1 screw).
7. Remove the middle inner cover [B] (2 screws).
8. Disconnect the four-pin connector [C] and release the harness from the clamp.
9. Remove the transfer belt positioning plate [D] (1 screw).
10. Remove the transfer belt unit.

    NOTE: Never touch the surface of the transfer belt.
11. When reinstalling the transfer belt unit, align gear [E] with the opening.

6.2 TRANSFER BELT REMOVAL



A133R566.wmf



A133R567.wmf

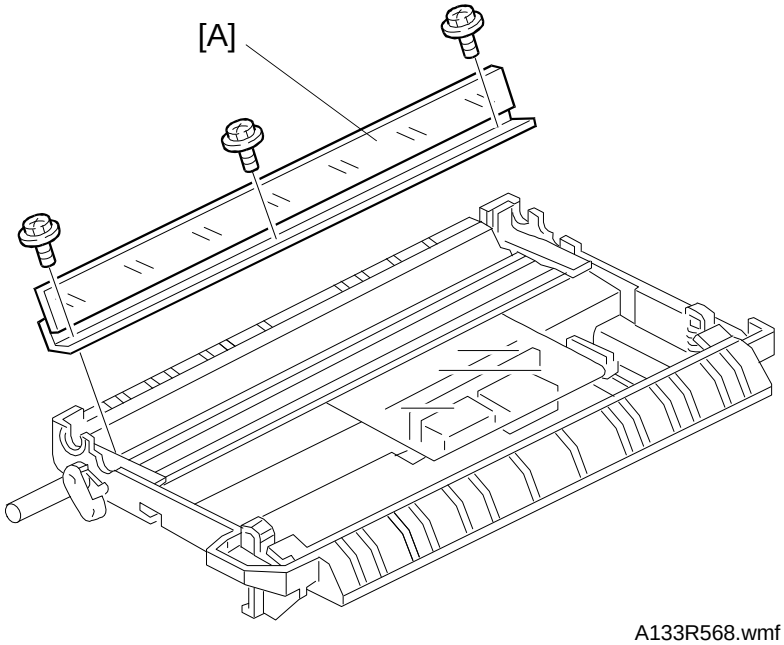
1. Turn off the main switch and unplug the machine.
2. Remove the transfer belt unit. (See Transfer Belt Unit Removal.)
3. Remove the three terminals [A] from the rear side plate of the transfer belt unit (3 screws).
4. Swing the transfer belt assembly [B] up by 90 degrees, then remove it.

   NOTE: Never touch the transfer belt surface.
5. Remove a screw [C] at the front and turn the belt drive holder [D].
6. Replace the transfer belt [E].

NOTE: 1) Before installing the new transfer belt, clean all the rollers and shafts (dry cloth) to prevent the belt from slipping.

2) When reinstalling, to avoid damage to the transfer belt, manually turn the rollers and check that the new transfer belt is not running over the edge of any of the rollers.

6.3 TRANSFER BELT CLEANING BLADE REPLACEMENT

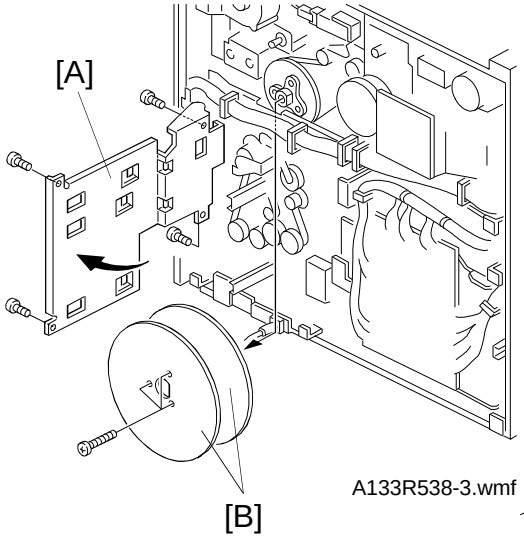


A133R568.wmf

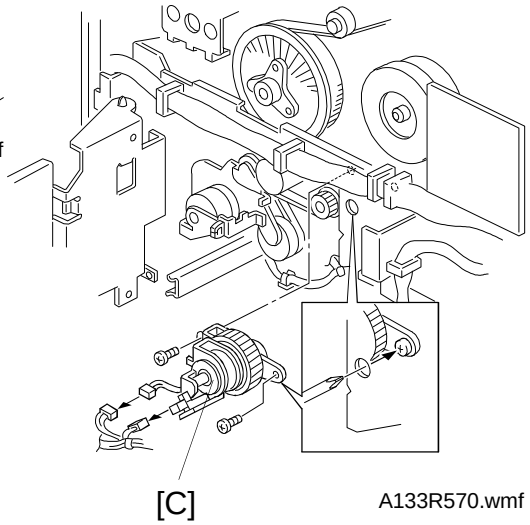
1. Remove the transfer belt unit. (See Transfer Belt Unit Removal.)
2. Remove the transfer belt assembly. (See Transfer Belt Replacement.)
3. Put the transfer belt assembly on a clean sheet of paper.
4. Remove the cleaning blade [A] (3 screws).

NOTE: 1) Do not touch the edge of the new blade.
2) Check that there is no dust/no damage on the edge of the new cleaning blade.

6.4 TRANSFER BELT LIFT CLUTCH



A133R538-3.wmf

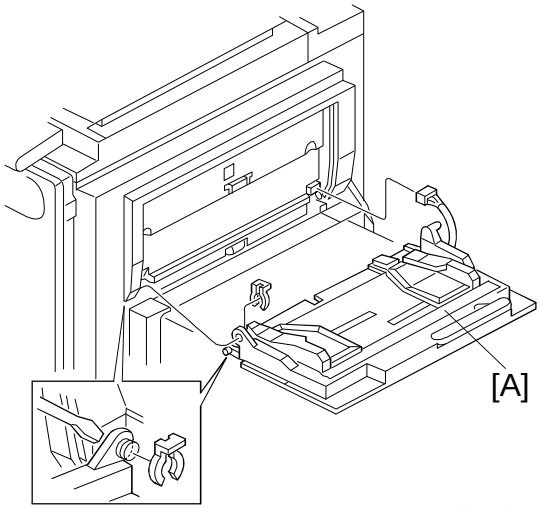


A133R570.wmf

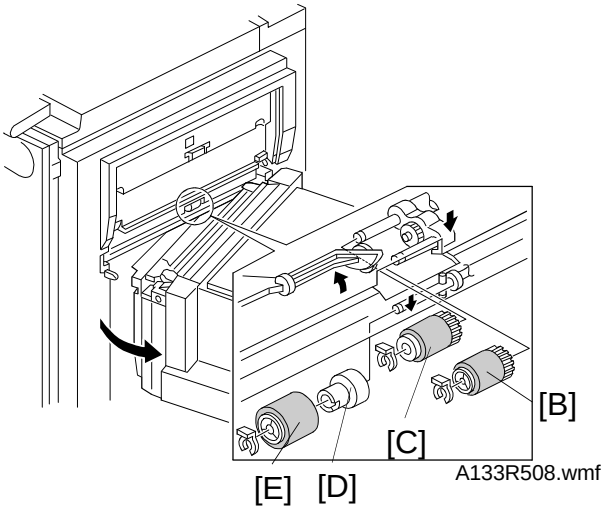
1. Turn off the main switch and unplug the machine.
2. Open the front cover.
3. Turn the lever "A1" clockwise.
4. Remove the rear cover. (See Outer Cover Removal.)
5. Swing out the SCU board plate [A] (4 screws).
6. Remove the fly wheels [B] (3 screws).
7. Replace the transfer belt lift clutch assembly [C] (2 connectors, 2 screws).

7. PAPER FEED

7.1 LCT PICK-UP, SEPARATION, AND FEED ROLLER REPLACEMENT



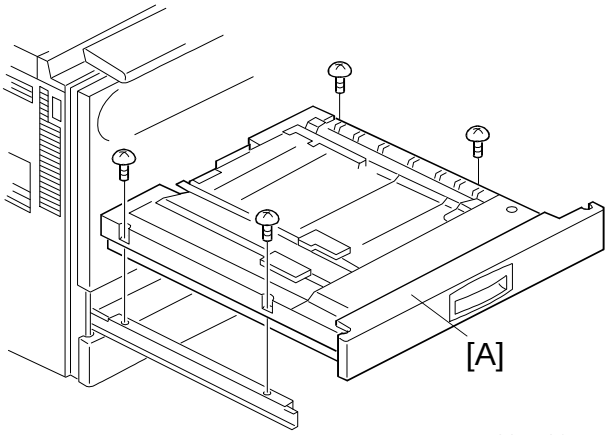
A133R507.wmf



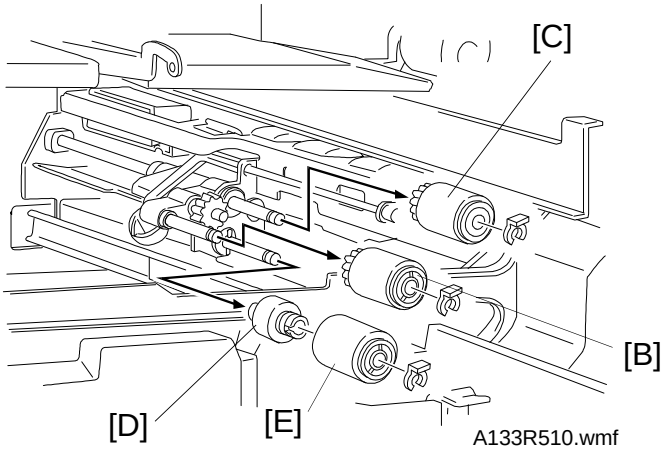
A133R508.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the by-pass feed table [A] (1 clip, 1 connector).
3. Open the LCT unit.
4. Remove the pick-up roller [B], feed roller [C], torque limiter [D], and the separation roller [E] (1 clip each).

7.2 TRAY PICK-UP, SEPARATION, AND FEED ROLLER REPLACEMENT



A133R509.wmf

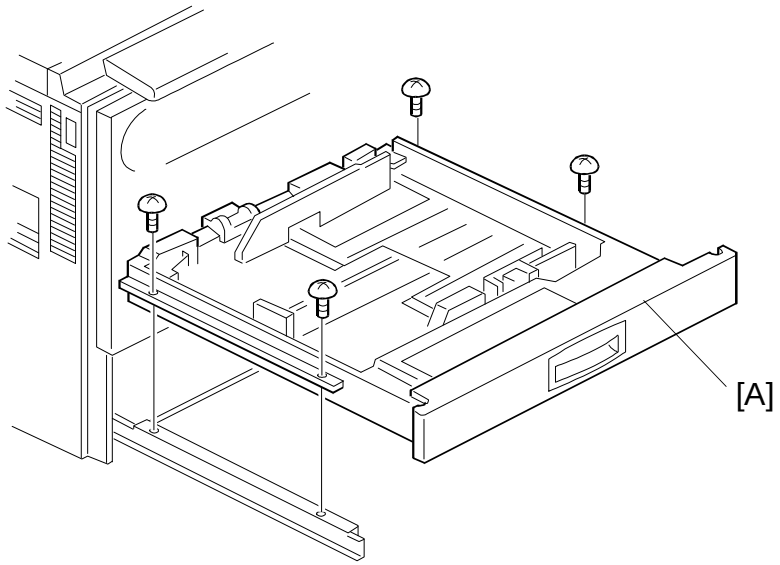


A133R510.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the duplex tray [A] (4 screws).
3. Remove the pick-up [B] and feed [C] rollers, torque limiter [D], and the separation roller [E] (1 clip each).

NOTE: After reinstalling the duplex tray, perform the printer side-to-side registration adjustment and the main scan magnification adjustment (see section 12).

7.3 PAPER FEED TRAY REPLACEMENT

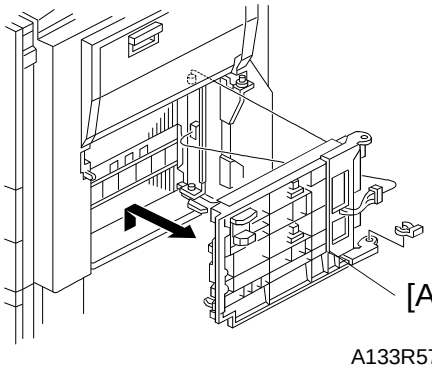


A133R612.wmf

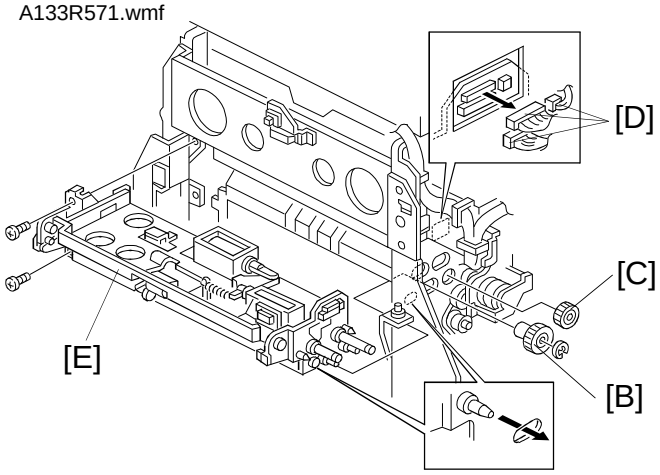
1. Turn off the main switch and unplug the machine.
2. Remove the paper feed tray [A] (4 screws).

NOTE: After reinstalling the paper feed tray, perform the side-to-side registration adjustment and the main scan magnification adjustment (see section 12).

7.4 BYPASS PAPER FEED UNIT REMOVAL



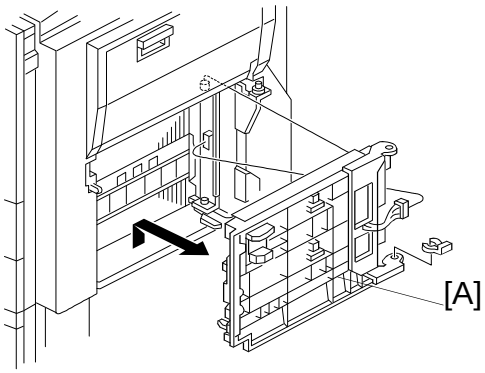
A133R571.wmf



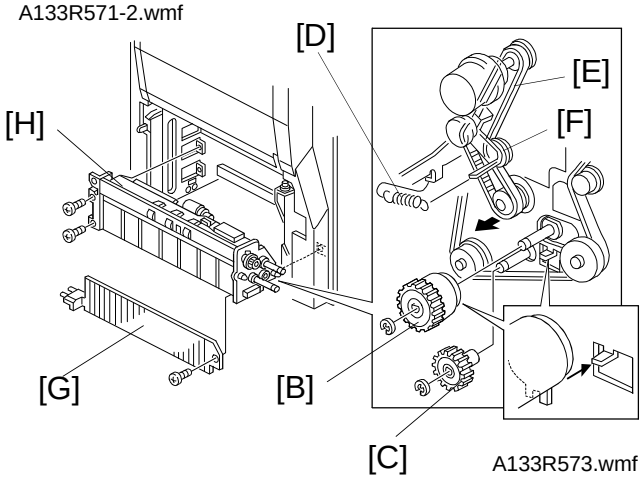
A133R572.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the LCT. (See LCT Unit Removal.)
3. Remove the vertical transport guide [A] (1 clip, 1 connector).
4. Remove the by-pass table. (See LCT Pick-up, Separation, and Feed Roller Replacement.)
5. Remove the right cover. (See Outer Cover Removal.)
6. Remove the SCU board, by-pass feed clutch, and by-pass relay clutch. (See By-pass Feed and By-pass Relay Clutch Replacement.)
7. Remove the separation roller drive gear [B] (1 E-ring).
8. Remove the relay gear [C].
9. Disconnect the connectors [D] (3 connectors).
10. Remove the by-pass paper feed unit [E] (2 screws).

7.5 TRAY PAPER FEED UNIT REMOVAL



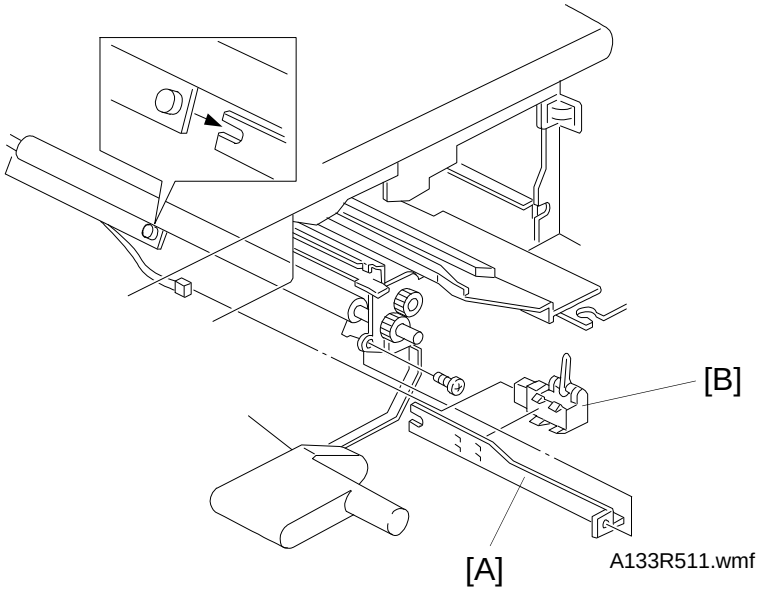
A133R571-2.wmf



A133R573.wmf

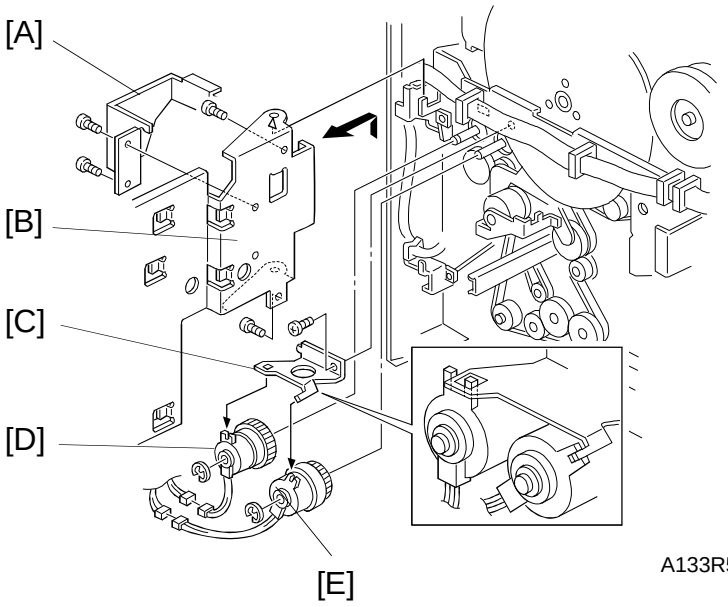
1. Turn off the main switch and unplug the machine.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Remove the LCT unit. (See LCT Unit Removal.)
4. Remove the vertical transport guide [A] (1 snap ring and 1 connector).
5. Remove the paper feed clutch [B]. (See Paper Feed Clutch Replacement.)
6. Remove the separation roller gear [C] (1 E-ring).
7. Remove the spring [D] and remove the timing belt [E] from the relay roller pulley [F].
8. Remove the small vertical transport guide plate [G] (1 screw).
10. Remove the paper feed unit [H] (2 screws, 1 connector).

7.6 REGISTRATION SENSOR REPLACEMENT



1. Turn off the main switch and unplug the machine.
2. Remove the front cover. (See Outer Cover Removal.)
3. Remove the right inner cover. (See Inner Cover Removal.)
4. Remove the transfer belt assembly. (See Transfer Belt Unit Removal.)
5. Remove the registration sensor bracket [A] (1 screw, 1 connector).
6. Remove the registration sensor [B].

7.7 BY-PASS FEED AND BY-PASS RELAY CLUTCH REPLACEMENT

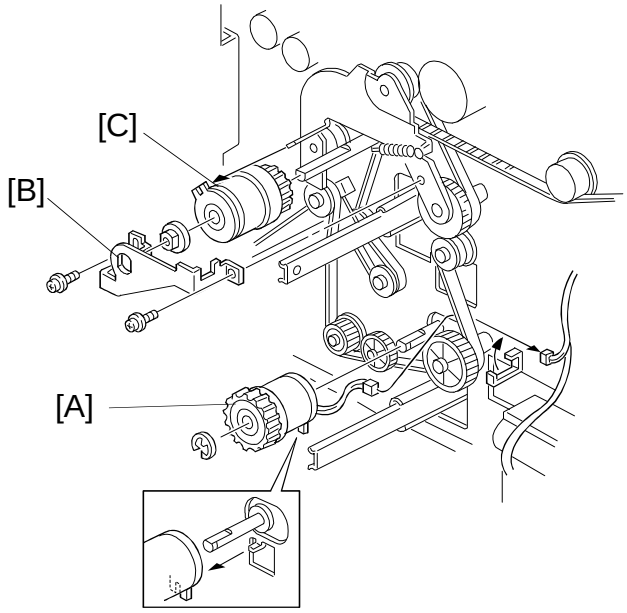


A133R574.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the rear cover. (See Outer Cover Removal.)

– 230 V machine only for step 3 –

3. Remove the grounding plate bracket [A] (2 screws).
4. Remove the SCU board plate [B] (4 screws, all connectors).
5. Remove the clutch stopper [C] (1 screw).
6. Replace the by-pass feed [D] and by-pass relay clutches [E] (1 connector each, 1 E-ring each).



A133R575.wmf

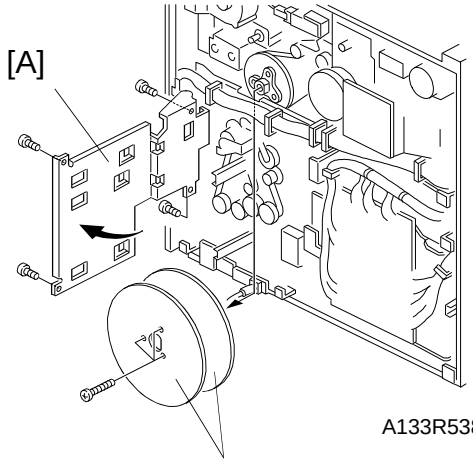
7.8 PAPER FEED CLUTCH REPLACEMENT

1. Turn off the main switch and unplug the machine.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Swing out the SCU board (4 screws).
4. Replace the paper feed clutch [A] (1 connector, 1 E-ring).

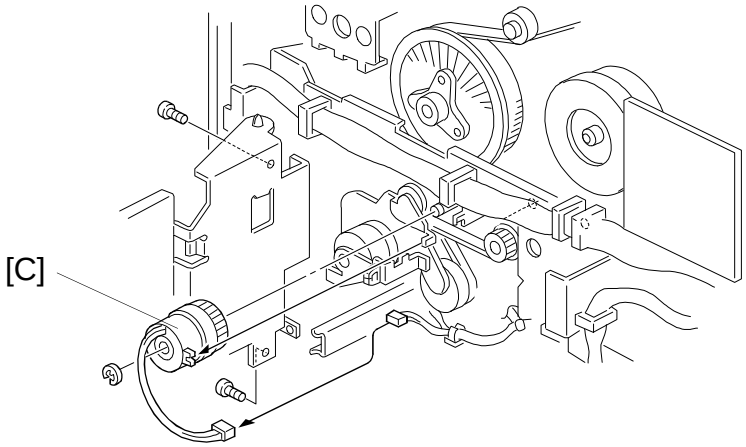
7.9 RELAY CLUTCH REPLACEMENT

1. Turn off the main switch and unplug the machine.
2. Remove the rear cover.
3. Swing out the SCU board (4 screws).
4. Remove the clutch holder [B] (2 screws).
5. Replace the relay clutch [C] (1 bushing, 1 connector).

7.10 REGISTRATION CLUTCH REPLACEMENT



A133R538-3.wmf

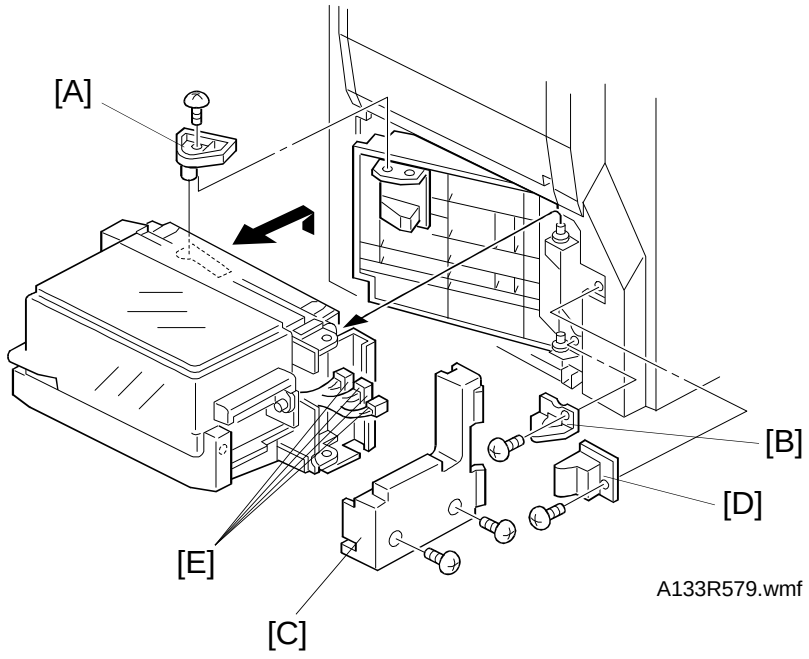


A133R576.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Swing out the SCU board [A] (4 screws).
4. Remove the fly wheels [B] (3 screws).
5. Remove the registration clutch [C] (1 connector, 1 E-ring).

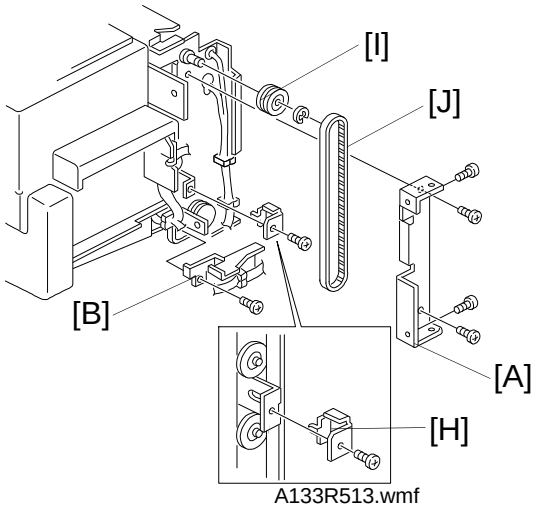
8. LCT UNIT

8.1 LCT UNIT REMOVAL

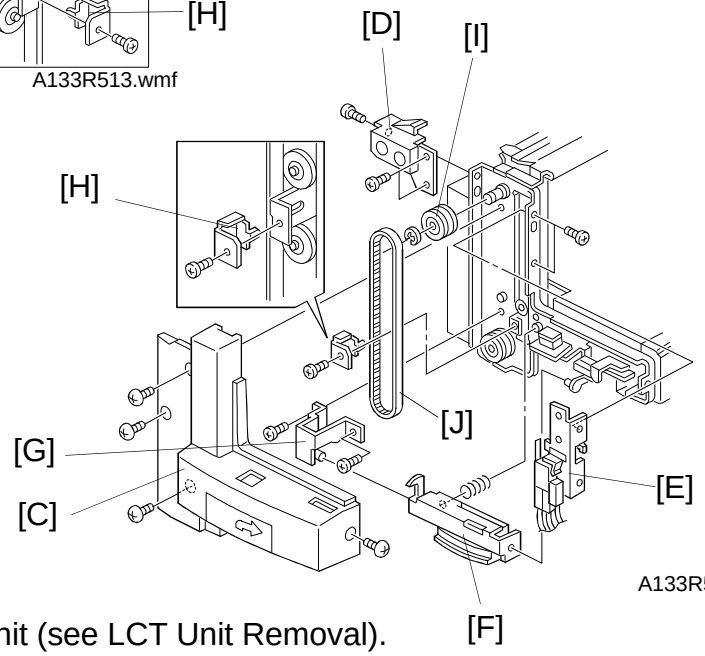


1. Turn off the main switch and unplug the machine.
2. Remove the rear cover (see Outer Cover Removal).
3. Open the LCT unit.
4. Remove the support guide [A] (1 screw).
5. Remove the harness cover [B] (1 screw).
6. Remove the LCT's rear cover [C] (2 screws).
7. Remove the stopper bracket [D] (1 screw).
8. Disconnect four connectors [E].
9. Remove the LCT.

8.2 LCT DRIVE BELT REPLACEMENT



A133R513.wmf

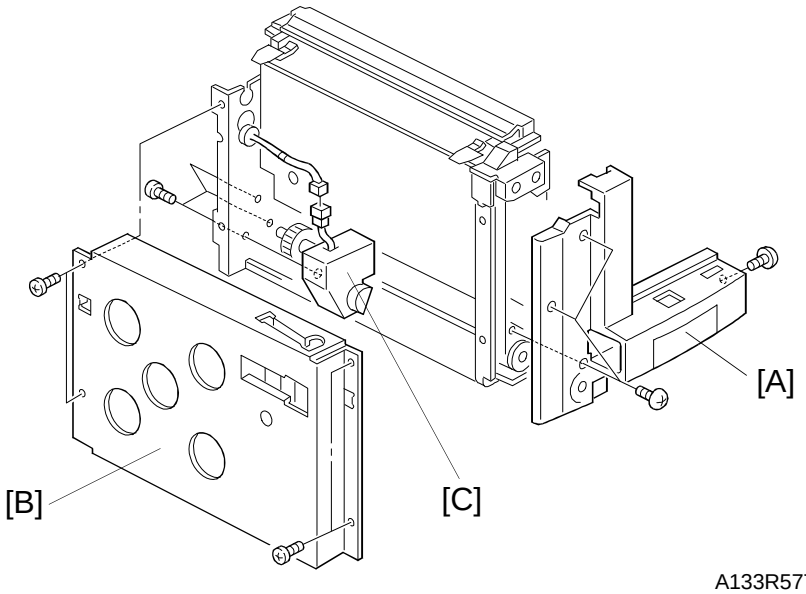


A133R514.wmf

1. Remove the LCT unit (see LCT Unit Removal).
2. Remove the upper belt cover [A] (4 screws).
3. Remove the lower belt cover [B] (1 screw).
4. Remove the front cover [C] (4 screws).
5. Remove the front upper bracket with cover [D] (3 screws).
6. Remove the LCT switch [E] (2 screws, 1 connector)
7. Remove the grip holding bracket [F] and grip bracket [G] (2 screws).
8. Remove the belt stoppers [H] (1 screw each).
9. Remove the upper pulley [I] and LCT drive belt [J] (1 E-ring each).

NOTE: When reinstalling the belt stoppers, make sure that the LCT bottom plate is at the bottom.

8.3 LCT MOTOR REPLACEMENT



A133R577.wmf

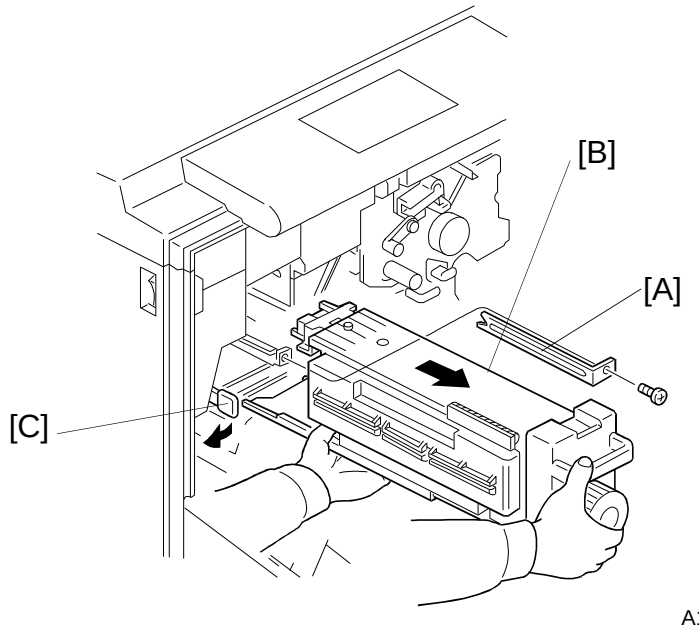
1. Remove the LCT. (See LCT Unit Removal.)
2. Remove the front cover [A] (4 screws).
3. Remove the left plate [B] (4 screws).
4. Remove the LCT motor [C] (3 screws, 1 connector).

9. FUSING

9.1 FUSING UNIT REMOVAL

⚠ CAUTION

Allow time for the unit to cool before doing the following procedure.

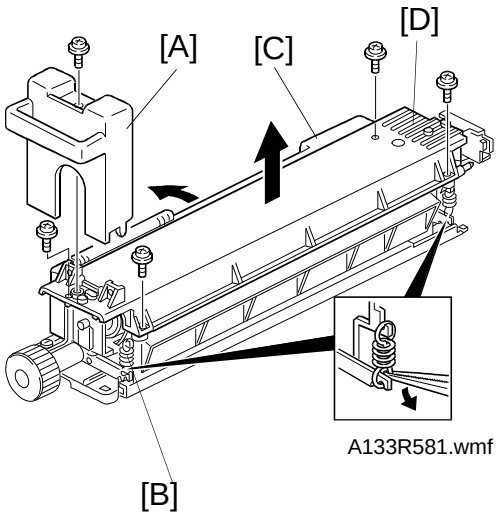


A133R580.wmf

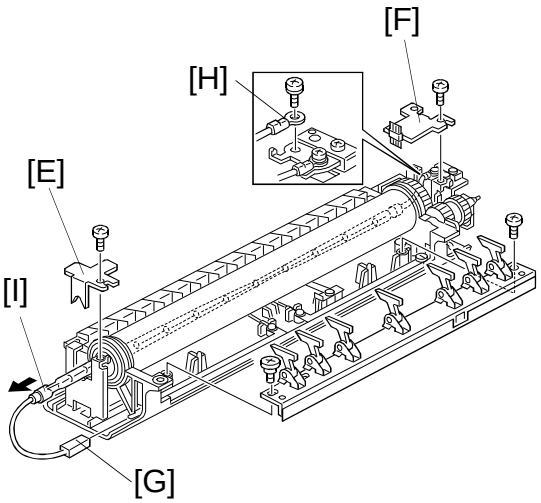
1. Turn off the main switch and unplug the machine.
2. Open the front cover.
3. Remove the stopper bracket [A] (1 screw).
4. Hold the fusing unit cover [B] while pushing the release lever [C] to the left, and pull out the fusing unit until it stops.
5. Push the release lever again, and remove the fusing unit completely.

NOTE: Before completely removing the fusing unit, support the bottom of the fusing unit.

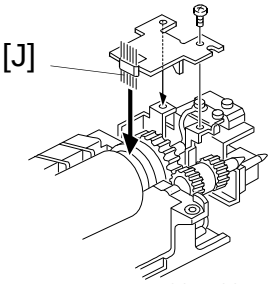
9.2 FUSING LAMP REPLACEMENT



A133R581.wmf



A133R582.wmf

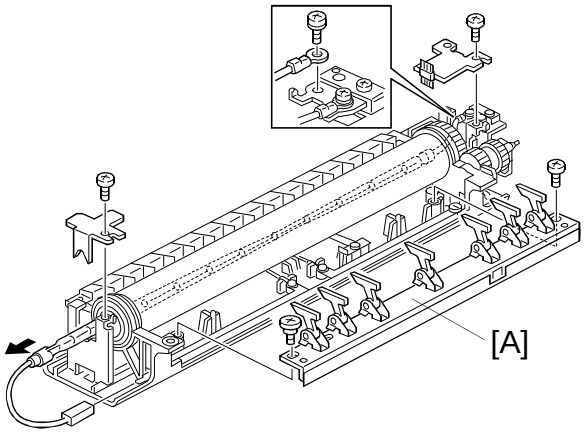


A133R583.wmf

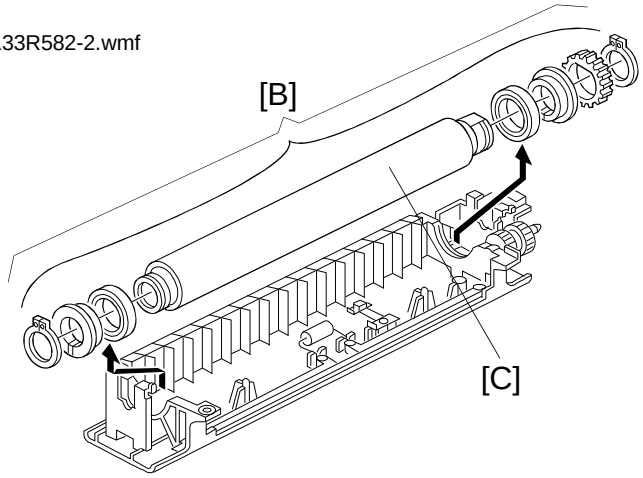
1. Remove the fusing unit (see Fusing Unit Removal).
2. Remove the fusing unit cover [A] (1 screw).
3. Remove the pressure springs [B].
4. Open the fusing exit cover [C] and remove the fusing upper unit [D] (4 screws).
5. Remove the front lamp holder [E] (1 screw).
6. Remove the rear lamp holder [F] (1 screw).
7. Disconnect the front lamp connector [G] and the rear lamp terminal [H] (1 screw).
8. Remove the lamp [I].
9. Install the new lamp.

NOTE: 1) Do not touch the glass part of the fusing lamp with bare hands.
2) When reinstalling the rear lamp holder, make sure that the antistatic brush [J] contacts the hot roller and the pressure roller as shown.
3) The standard pressure spring position is at the upper position.

9.3 HOT ROLLER REPLACEMENT



A133R582-2.wmf

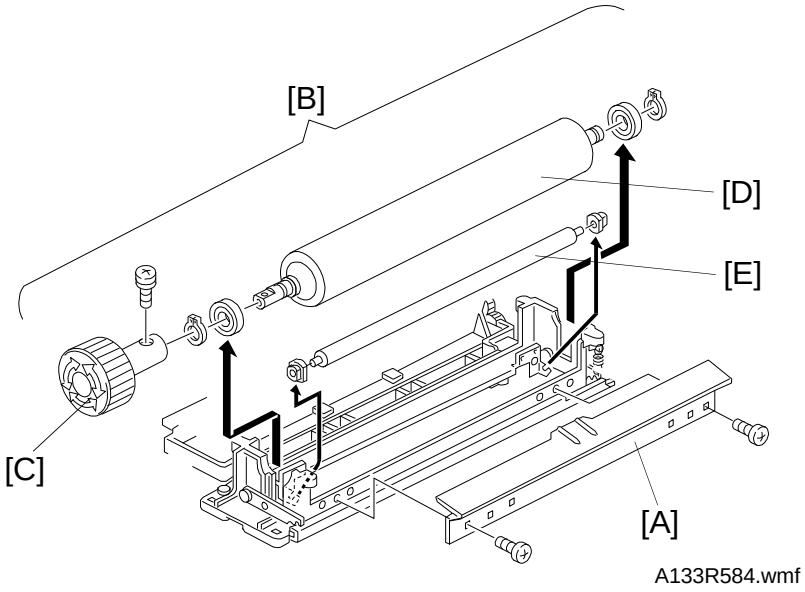


A133R613.wmf

1. Remove the fusing lamp (see Fusing Lamp Replacement).
2. Remove the hot roller stripper pawl assembly [A] (1 screw, 1 step screw).
3. Remove the hot roller assembly [B].
4. Replace the hot roller [C] (2 C-rings, 1 gear, 2 bearings, 2 bushings).

NOTE: 1) Before installing the hot roller, peel off 3 cm (1 inch) from both ends of the protective sheet on the new one.
2) The standard pressure spring position is at the upper position.
3) Do not touch the surface of the rollers.
4) Be careful not to damage the surface of the hot roller.

9.4 PRESSURE ROLLER AND CLEANING ROLLER REPLACEMENT



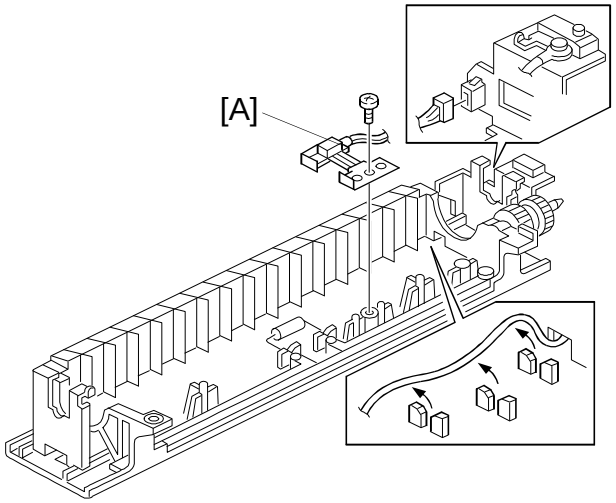
1. Remove the fusing unit (see Fusing Unit Removal).
2. Remove the pressure springs and remove the lower fusing unit (4 screws).
3. Remove the lower fusing entrance guide [A] (2 screws).
4. Remove the pressure roller assembly [B].
5. Remove the fusing knob [C].
6. Replace the pressure roller [D] (2 C-rings, 2 bearings).
7. Replace the cleaning roller [E] (2 bushings).

NOTE: 1) When reinstalling the fusing entrance guide, tighten the screws while pushing the guide plate up to the upper position (for standard or thin paper). For thick paper, let the entrance guide plate drop to the lowest position.

2) There are three screw holes on each side for securing the entrance guide. Normally, the outer screw hole on each side is used.

3) The standard pressure spring position is at the upper position.

9.5 THERMISTOR REPLACEMENT

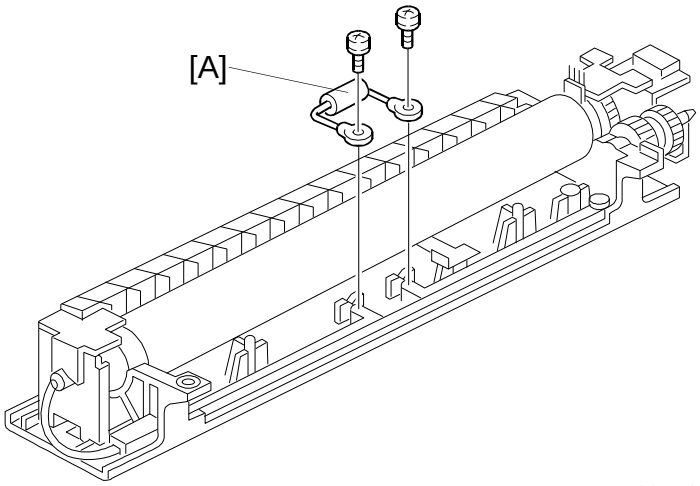


A133R585.wmf

1. Remove the fusing unit (see Fusing Unit Removal).
2. Remove the hot roller assembly (see Hot Roller Replacement).
3. Remove the thermistor [A] (1 screw, 1 connector).

NOTE: 1) Do not touch the surface of the hot roller.
2) Be careful not to damage the surface of the hot roller.
3) The standard pressure spring position is at the upper position.

9.6 THERMOFUSE REPLACEMENT

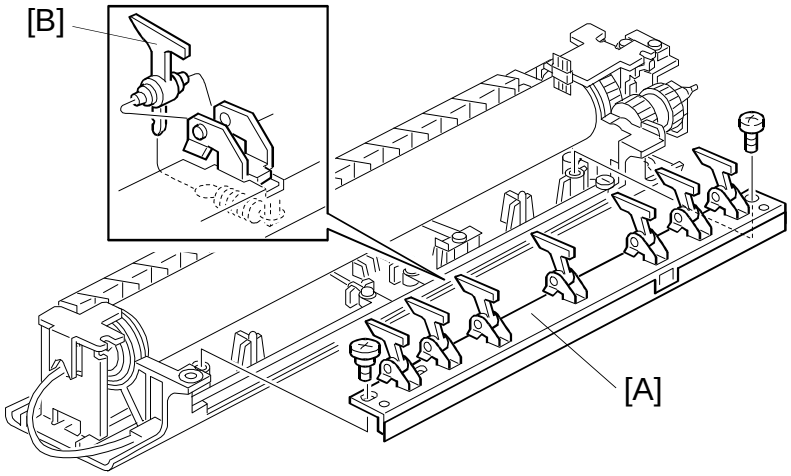


A133R586.wmf

1. Remove the fusing unit. (See Fusing Unit Removal.)
2. Remove the pressure springs and remove the upper fusing unit. (See Fusing Lamp Replacement.)
3. Remove the stripper pawl assembly. (See Hot Roller Replacement.)
4. Remove the thermofuse [A] (2 screws).

NOTE: 1) Do not touch the surface of the hot roller.
2) When replacing the thermofuse, make sure that you do not damage the hot roller.
3) The standard pressure spring position is at the upper position.

9.7 HOT ROLLER STRIPPER PAWL REPLACEMENT

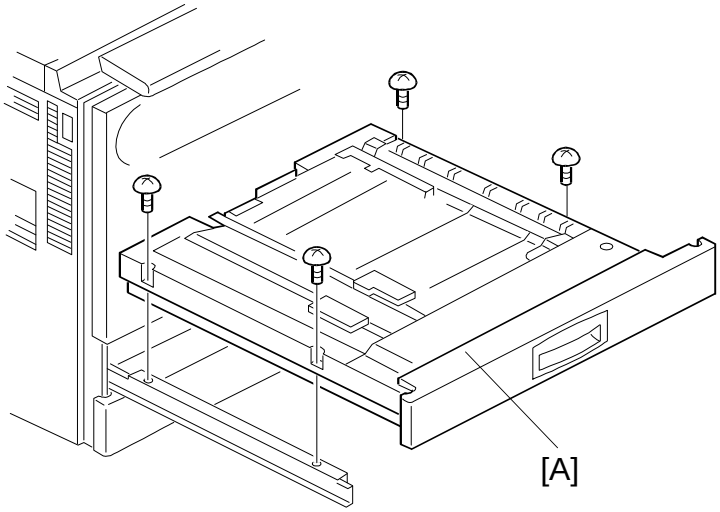


A133R614.wmf

1. Remove the fusing unit. (See Fusing Unit Removal.)
2. Remove the fusing unit cover and pressure springs. (See Fusing Lamp Replacement.)
3. Remove the fusing upper unit. (See Fusing Lamp Replacement.)
4. Remove the hot roller stripper pawl assembly [A] (1 screw, 1 step screw).
5. Replace the hot roller stripper pawls [B] (1 spring each).

10. DUPLEX UNIT

10.1 DUPLEX UNIT REMOVAL

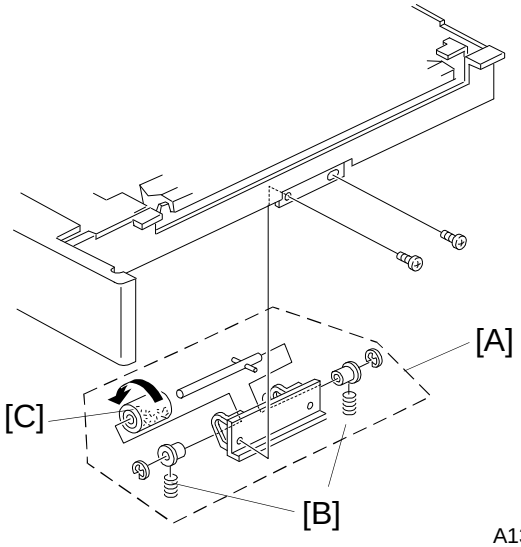


A133R509-2.wmf

1. Pull the duplex unit out.
2. Remove the duplex unit [A] (4 screws).

NOTE: After reinstalling the duplex unit, perform the side-to-side registration and main scan magnification adjustments (see section 12.)

10.2 FRICTION ROLLER REPLACEMENT

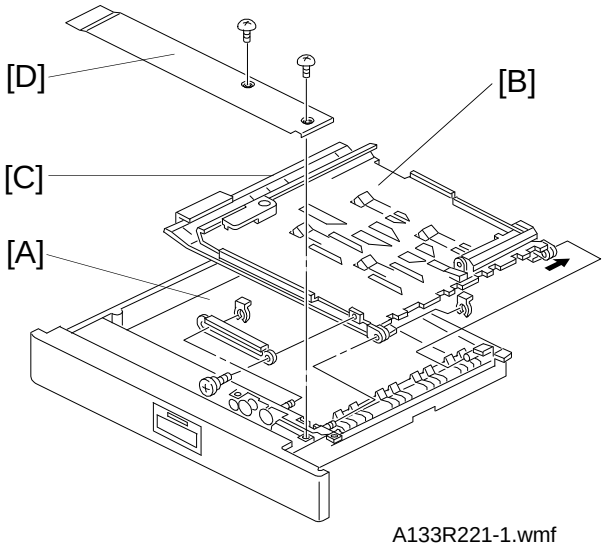


A133R521.wmf

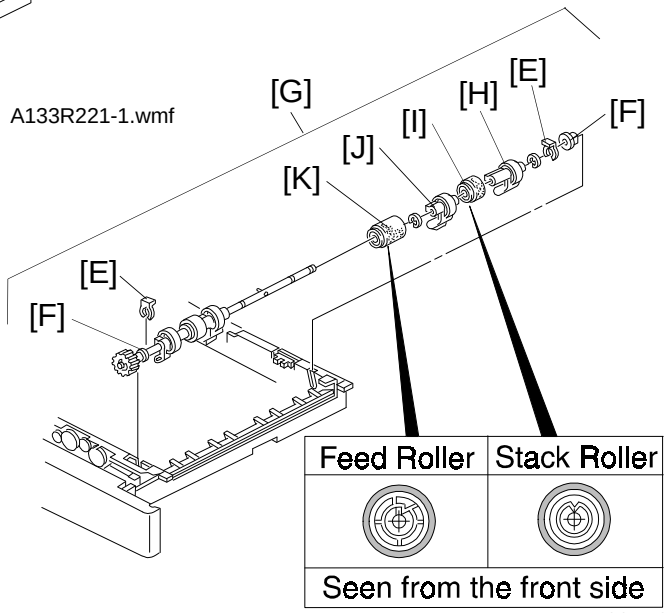
1. Remove the duplex unit. (See Duplex Unit Removal.)
2. Remove the separation roller assembly [A] (2 screws).
3. Remove the springs [B].
4. Remove the friction roller [C] (2 E-rings, 2 bushings).

NOTE: This friction roller has a one-way clutch. Be sure to install the roller so that it rotates in the direction of the arrow (see the illustration).

10.3 DUPLEX FEED ROLLER REPLACEMENT



A133R221-1.wmf

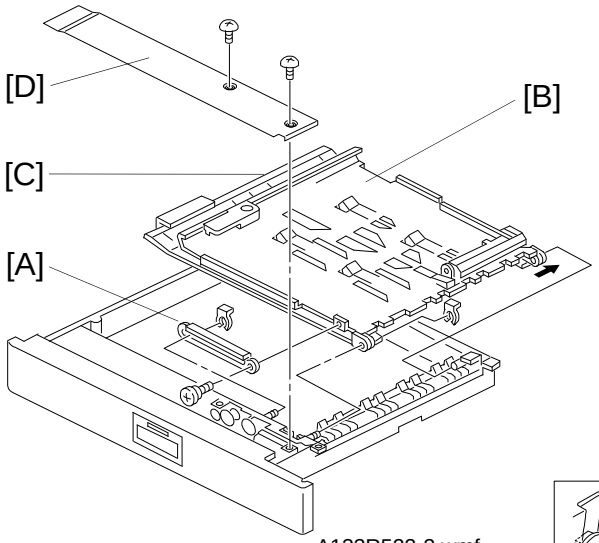


A133R523.wmf

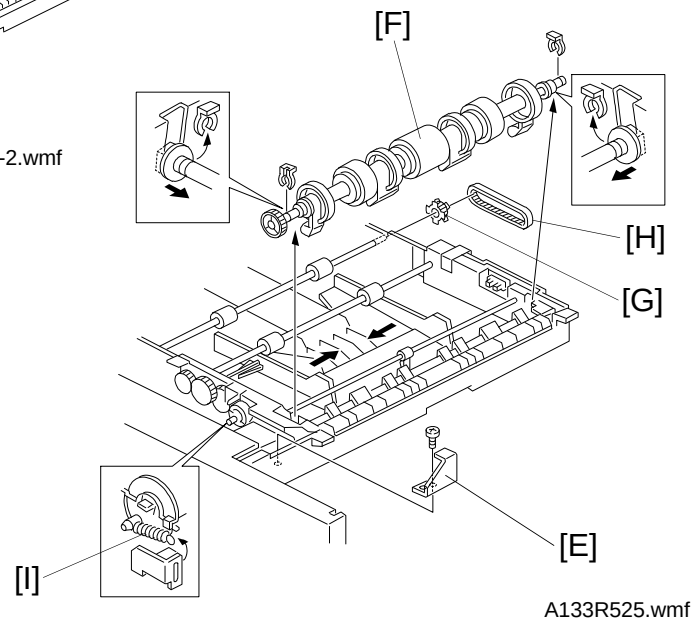
1. Pull out the duplex unit.
2. Remove the link bracket [A] (1 screw, 1 clip).
3. Remove the upper guide plate [B] and the lower guide plate [C] (1 clip).
4. Remove the inner cover [D] (2 screws).
5. Remove two snap rings [E].
6. Move the bushings [F] inward and remove the duplex feed roller assembly [G].
7. Remove the bushing [F], the paper flattener [H] (1 E-ring), the stack roller [I], the paper flattener [J], and the duplex feed roller [K].

NOTE: When installing the stack roller and the duplex feed roller, make sure that they are inserted in the correct orientation as shown.

10.4 DUPLEX FEED MOTOR REPLACEMENT

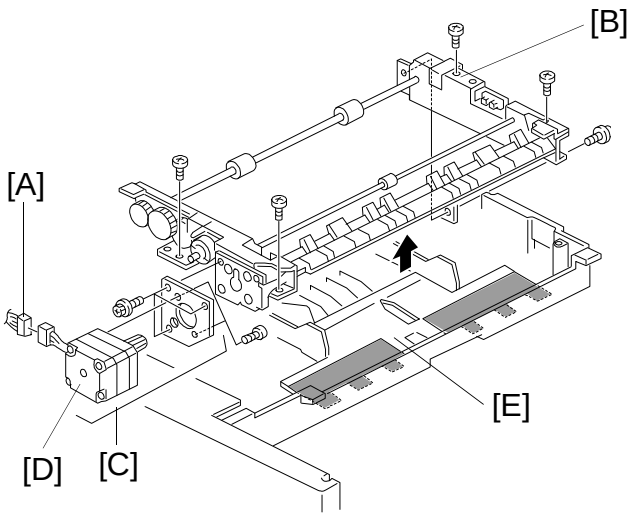


A133R522-2.wmf

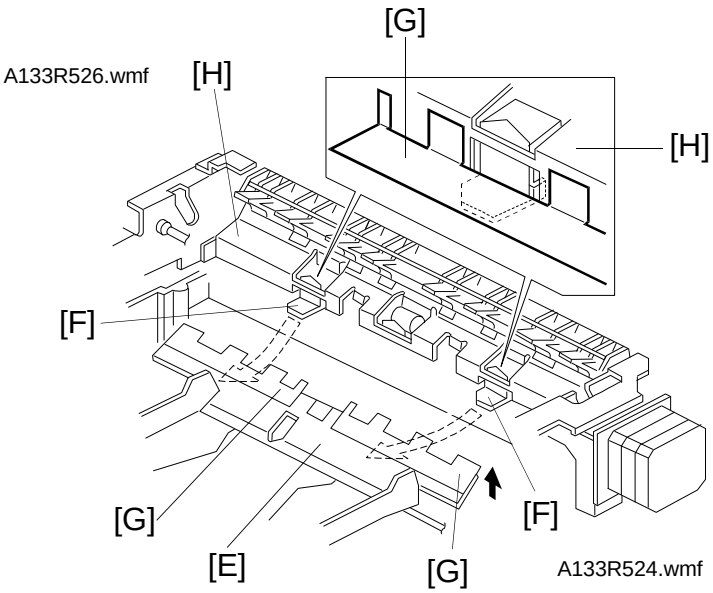


A133R525.wmf

1. Remove the duplex unit (4 screws).
2. Remove the link bracket [A] (1 screw, 1 snap ring).
3. Remove the upper guide plate [B] and the lower guide plate [C] (1 snap ring).
4. Remove the inner cover [D] (1 screw).
5. Remove the inner cover bracket [E] (1 screw).
6. Remove the duplex feed roller assembly [F] (2 snap rings).
7. Remove the timing belt pulley [G] and remove the timing belt [H].
8. Remove the spring [I].



A133R526.wmf



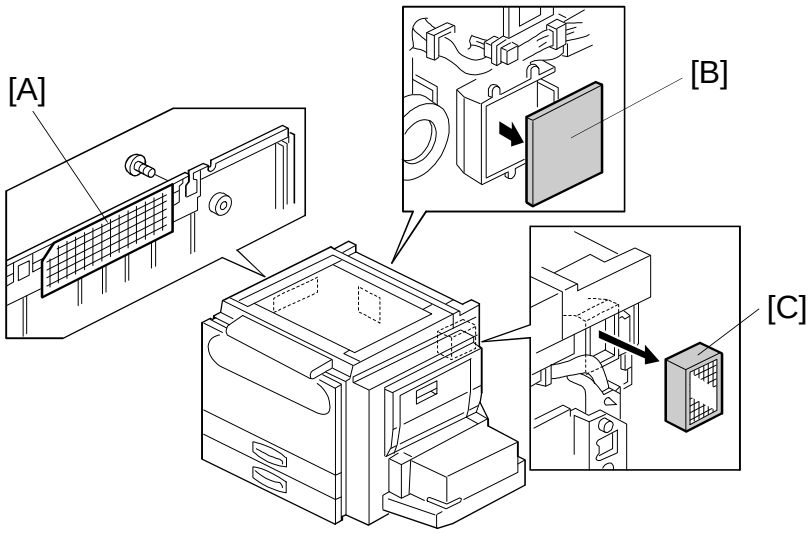
A133R524.wmf

9. Disconnect the motor harness [A].
10. Move the jogger fence inward and remove the paper feed assembly [B] (5 screws).
11. Remove the duplex feed motor assembly [C] (3 screws).
12. Replace the duplex feed motor [D] (2 screws).

NOTE: 1) When installing the paper feed assembly, make sure that the bottom plate [E] is on top of the bracket [F] as shown.
2) When installing the paper feed assembly, make sure that the mylars [G] on the bottom plate are on top of the guide plate [H] as shown.

11. OTHERS

11.1 FILTERS



A133R608.wmf

11.1.1 Optics Dust Filter

1. Remove the left cover (see Outer Cover Removal).
2. Replace the optics dust filter [A].

11.1.2 Fusing Exhaust Fan Filter

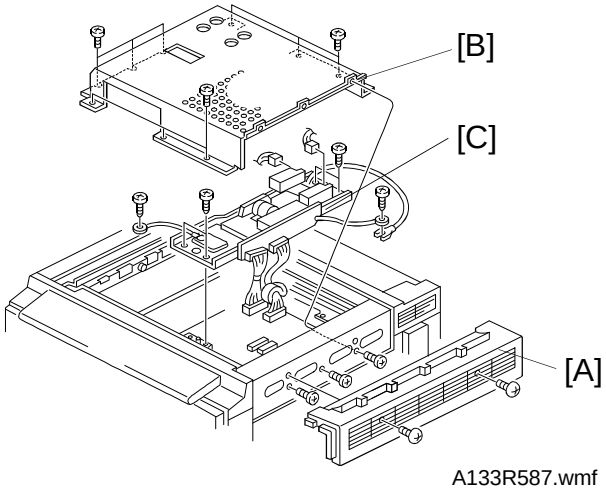
1. Remove the rear cover (see Outer Cover Removal).
2. Replace the fusing exhaust fan filter [B].

11.1.3 Ozone Filter

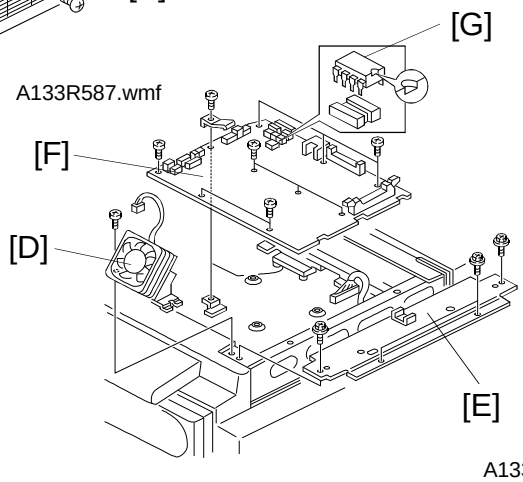
1. Remove the right cover (see Outer Cover Removal).
2. Replace the ozone filter [C].

11.2 PCB REPLACEMENT

11.2.1 SBU Assembly/EX-IPU Replacement



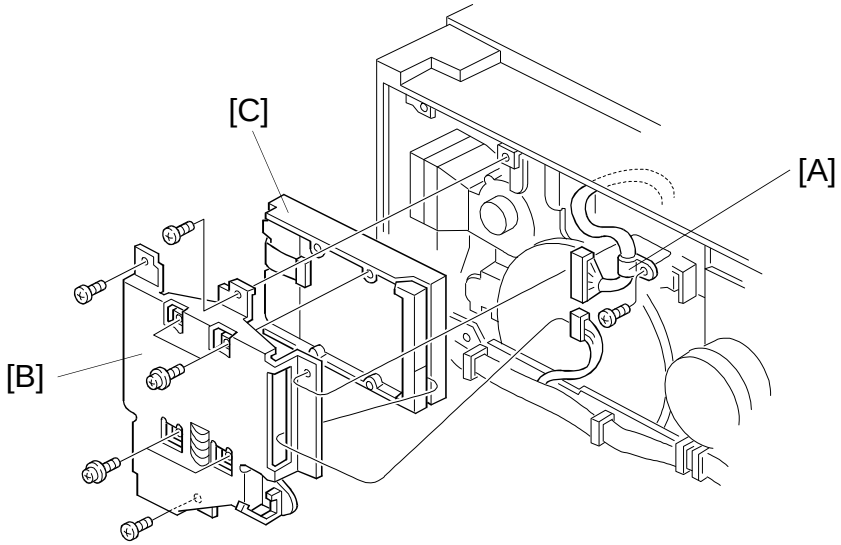
A133R587.wmf



A133R588.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the exposure glass (see Exposure Glass Removal).
3. Remove the right upper cover [A] (2 screws).
4. Remove the SBU cover [B] (11 screws).
5. Remove the lens block/SBU assembly [C] (6 screws, 4 connectors).
6. Remove the IPU fan motor [D] (1 screw).
7. Remove the upper right stay [E] (4 screws).
8. Remove the EX-IPU [F] (all connectors, 9 screws, 1 grounding plate)
9. Remove the E^2 PROM (IC52) [G] from the old EX-IPU and install it on the new board. This contains the hard disk bad sector data.
10. After reassembly, do the scanner registration and sub scan magnification adjustments in section 12 (check the printer registration settings first).

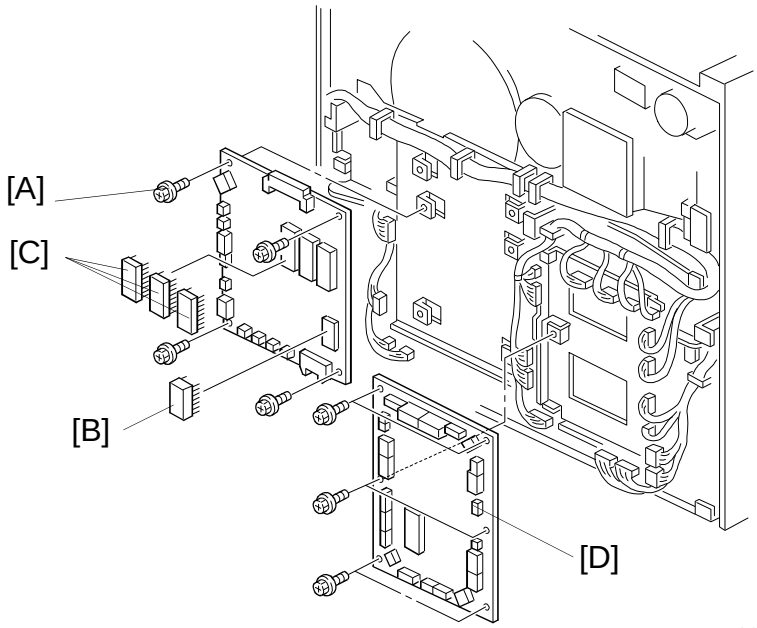
11.2.2 HDD Unit Replacement



A133R589.wmf

1. Turn off the main switch and unplug the machine.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Remove the wire clamp [A] (1 screw).
4. Remove the HDD unit assembly [B] (3 screws, 2 connectors).
5. Replace the HDD unit [C] (4 screws).

NOTE: 1) Reset the bad sector information (SP4911-6).
2) If the user has registered user stamps in the previous HDD unit, advise the user that they may need to register them again.



A133R590.wmf

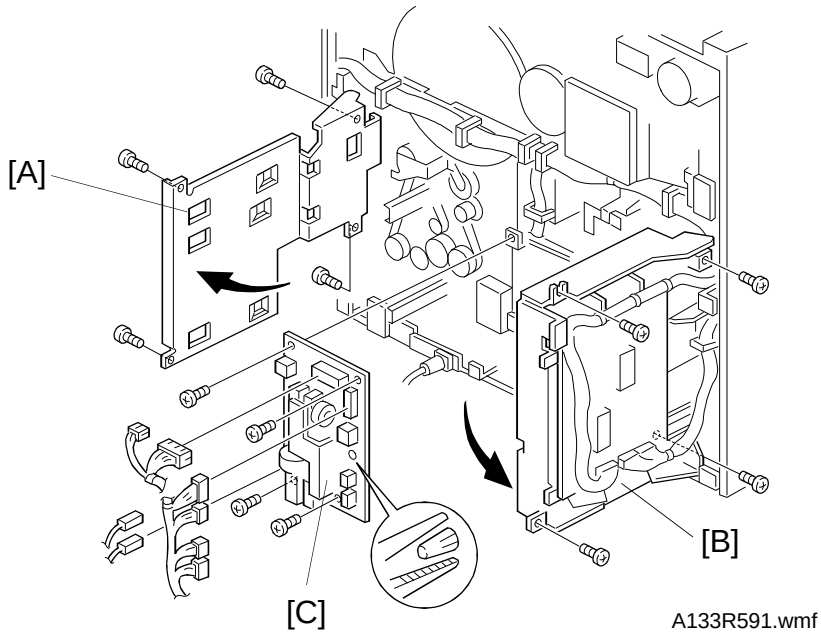
11.2.3 SCU Board Replacement

1. Turn off the main switch and unplug the machine.
2. Remove the rear cover (6 screws).
3. Replace the SCU board [A] (4 screws, all connectors).
4. Remove the NV RAM [B] from the old SCU board and install it on the new board.
5. Remove the ROMs [C] from the old SCU board and install them on the new board.
6. Make sure that the DIP switch settings on the new board are the same as those on the old board.

11.2.4 BCU Board Replacement

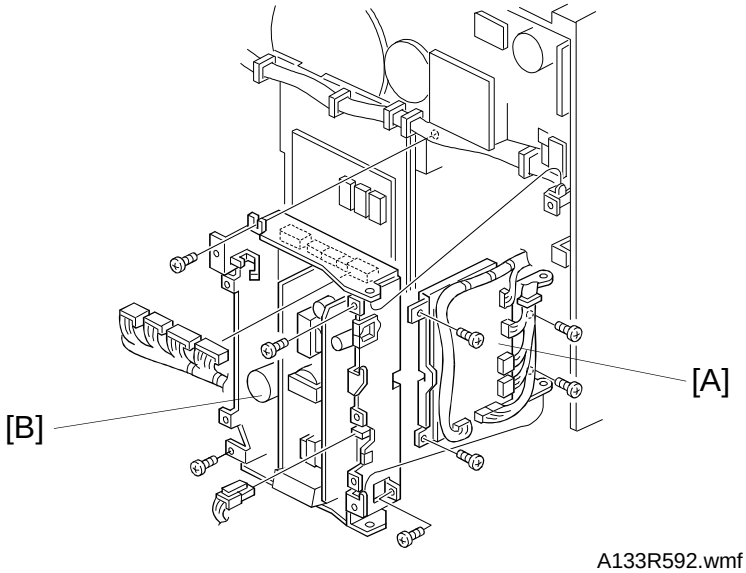
1. Turn off the main switch and unplug the machine.
2. Remove the rear cover (6 screws).
3. Replace the BCU board [D] (6 screws and all connectors).
4. Make sure that the DIP switch settings on the new board are the same as those on the old board.

11.2.5 AC Drive Board



1. Turn off the main switch and unplug the machine.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Swing out the SCU board [A] (4 screws).
4. Swing out the dc power supply unit/BCU board [B] (4 screws).
5. Replace the ac drive board [C] (all connectors, 4 screws).

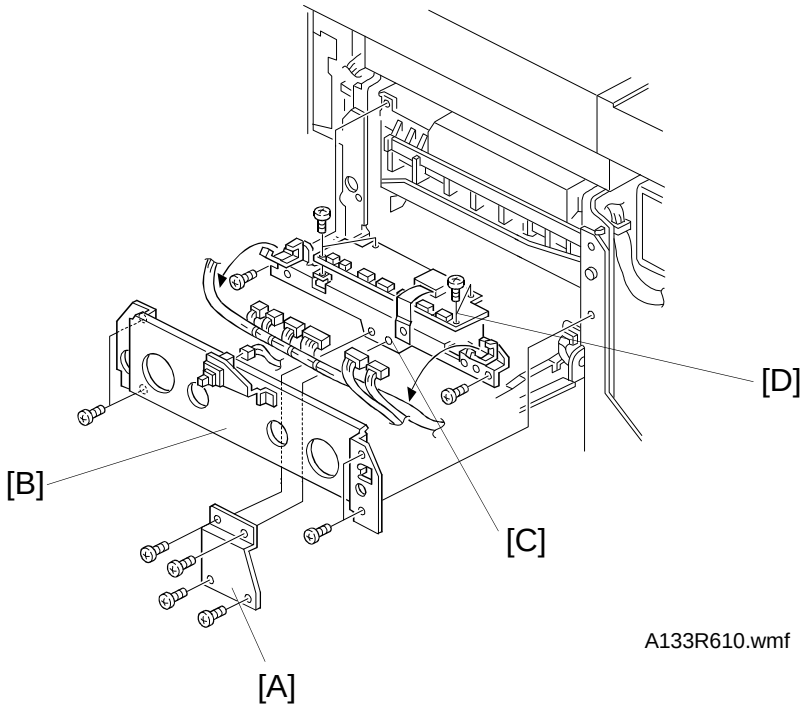
11.2.6 DC Power Supply Unit



A133R592.wmf

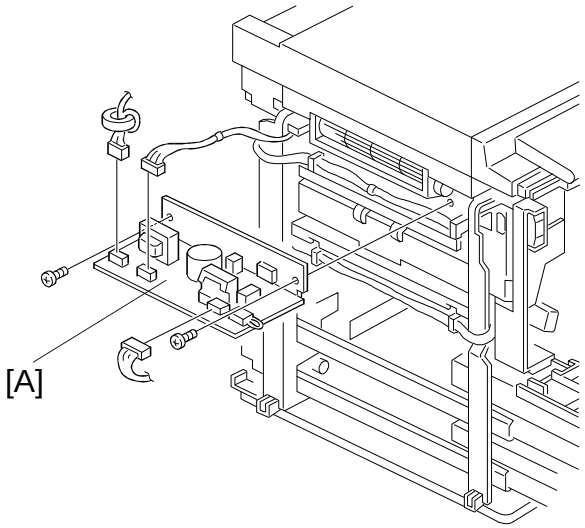
1. Turn off the main switch and unplug the power cable.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Remove the BCU board assembly [A] (all connectors, 4 screws).
4. Replace the dc power supply unit [B] (all connectors, 4 screws).

11.2.7 High Voltage Control Board



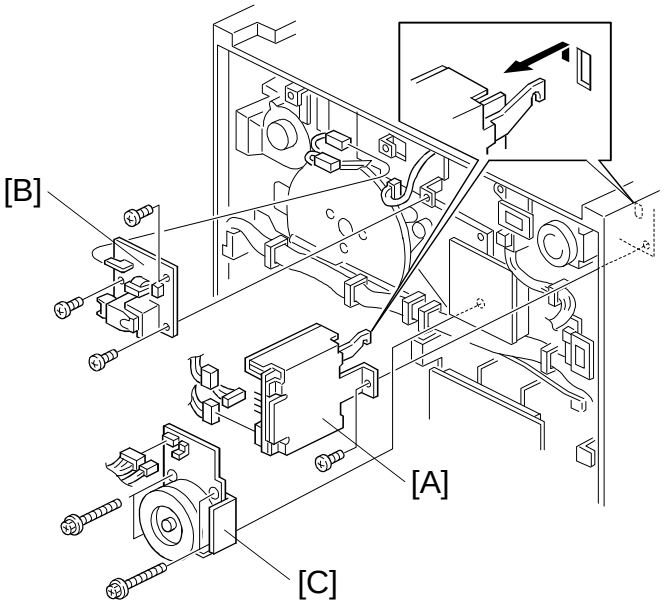
1. Turn off the main switch and unplug the machine.
2. Remove the right cover (See Outer Cover Removal).
3. Remove the lower grounding plate [A] (4 screws).
4. Remove the right stay [B] (1 connector, 4 screws).
5. Slide out the high voltage control board assembly [C] (all connectors, 2 screws).
6. Replace the high voltage control board [D] (4 screws).

11.2.8 Lamp Stabilizer



A133R593.wmf

1. Turn off the main switch and unplug the power cable.
2. Remove the left cover (see Outer Cover Removal).
3. Replace the lamp stabilizer [A] (3 connectors, 2 screws).



A133R594.wmf

11.2.9 Scanner Drive Board

1. Turn off the main switch and unplug the power cable.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Replace the scanner drive board [A] (all connectors, 1 screw).

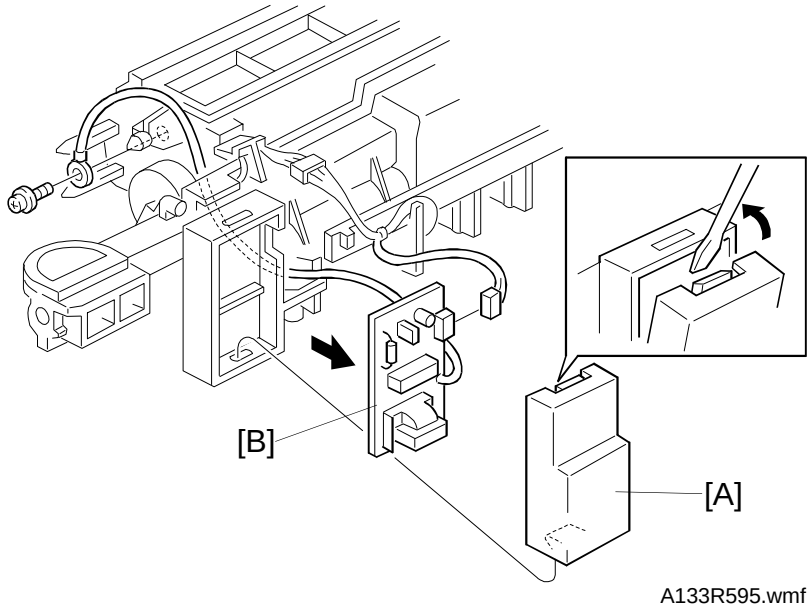
11.2.10 Charge High Voltage Supply Board

1. Turn off the main switch and unplug the power cable.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Replace the charge high voltage supply board [B] (3 connectors, 3 screws).

11.2.11 Main Motor

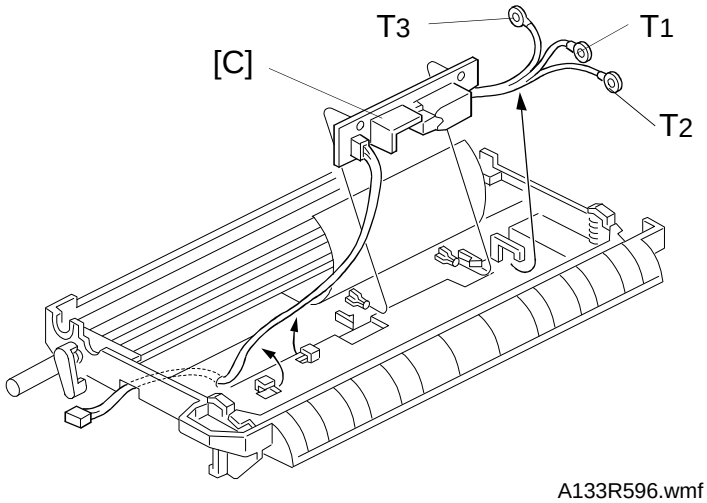
1. Turn off the main switch and unplug the power cable.
2. Remove the rear cover. (See Outer Cover Removal.)
3. Replace the main motor [C] (2 connectors, 4 screws).

11.2.12 Development Bias Power Pack

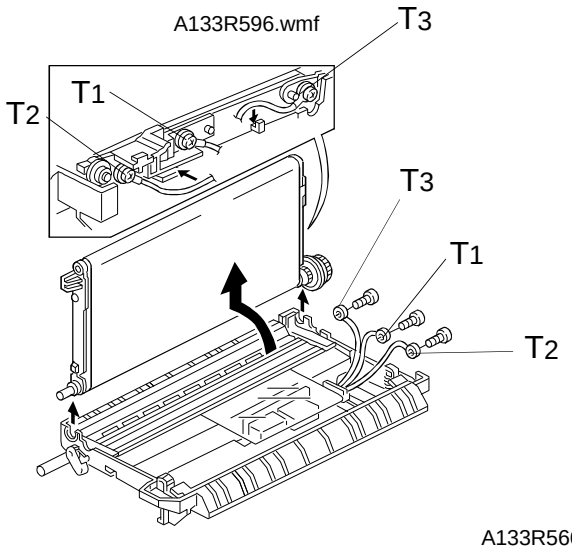


1. Turn off the main switch and unplug the power cable.
2. Remove the development unit (see Development Unit Removal).
3. Remove the cover [A] of the development bias power pack.
4. Replace the development bias power pack [B] (1 screw, 1 connector).

11.2.13 Transfer High Voltage Supply Board



A133R596.wmf



A133R566.wmf

1. Turn off the main switch and unplug the power cable.
2. Remove the transfer belt unit (see Transfer Belt Unit Replacement).
3. Remove the transfer belt assembly (see Transfer Belt Removal).
4. Replace the transfer high voltage board [C] (1 connector).
   NOTE: Be sure that each wire [T1, T2, T3] is placed as shown.

12. COPY IMAGE ADJUSTMENT- PRINTING/SCANNING

NOTE: 1) You need to perform these adjustment(s) after replacing any of the following parts:

- Scanner Wire
- Lens Block/SBU Assembly
- Scanner Drive Motor
- Polygon Mirror Motor
- Paper Trays
- Duplex Tray
- Paper Side Fence
- Memory All Clear

2) For more details about accessing SP modes, refer to section 4.

12.1 Printing

NOTE: 1) Make sure the paper is installed correctly in each paper tray before you start these adjustments.

2) Use the Trimming Area Pattern (SP2902-3, No.10) to print the test pattern for the following procedures.

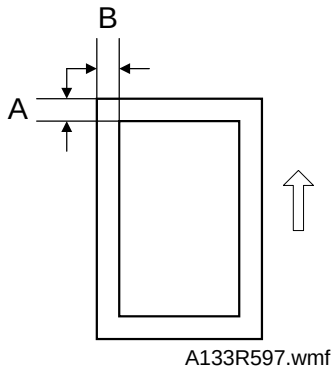
3) Set SP 2901-3 to 0 again after completing these printing adjustments.

12.1.1 Registration - Leading Edge/Side-to-Side

1. Check the leading edge registration, and adjust it using SP1001. The specification is: 3 ± 2mm

2. Check the side-to-side registration for each paper feed station, and adjust them using the following SP modes.

	SP mode	Specification
1st paper feed	SP1002-2	2 ± 1.5 mm
Duplex	SP1002-1	2 ± 1.5 mm
2nd paper feed (Optional PFU tray 1)	SP1002-3	2 ± 1.5 mm
3rd paper feed (Optional PFU tray 2)	SP1002-4	2 ± 1.5 mm
4th paper feed (Optional PFU tray 3)	SP1002-5	2 ± 1.5 mm
By-pass feed	SP1002-6	2 ± 1.5 mm
LCT	SP1002-7	2 ± 1.5 mm



A133R597.wmf

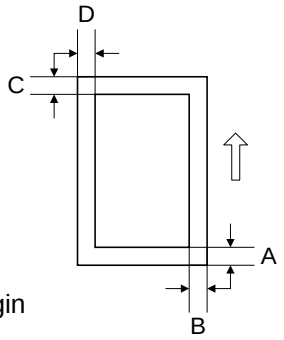
A: Leading Edge Registration
B: Side-to-side Registration

12.1.2 Blank Margins

NOTE: If the leading edge/side-to-side registration can not be adjusted within the specifications, adjust the leading/left side edge blank margin.

1. Check the trailing edge and right side edge blank margins, and adjust them using the following SP modes.

	SP mode	Specification
Trailing edge	SP2101-2	2±2 mm
Right side edge	SP2101-4	$2^{+2.5mm}_{-1.5mm}$
Leading edge	SP2101-1	3±2 mm
Left side edge	SP2101-3	2±1.5 mm

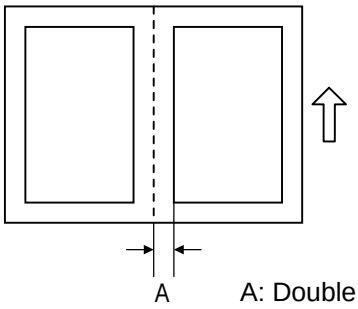


A: Trailing Edge Blank Margin
B: Right Side Edge Blank Margin
C: Leading Edge Blank Margin
D: Left Side Edge Blank Margin

A133R598.wmf

12.1.3 Double Copy Side-to-side Registration

NOTE: 1) Perform this adjustment after completing the registration adjustment and the blank margin adjustment for single copies.
2) Select the double copies mode in the Adjust Image menu using the copy mode to print the test pattern.



A: Double Copy Side-to-side Registration

A133R599.wmf

1. If you need to adjust the double copy side-to-side registration, use SP1006.

12.2 Scanning

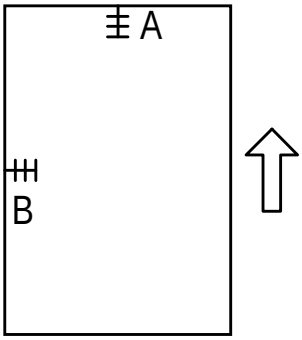
NOTE: 1) Perform or check the printing registration/side-to-side adjustment and the blank margin adjustment, before doing the following scanner adjustment.

2) Use an OS-A3 test chart to perform the following adjustments.

12.2.1 Registration: Platen Mode

1. Place the test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the leading edge and side-to-side registration, and adjust them using the following SP modes if necessary.

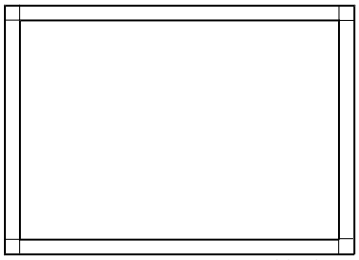
	SP mode
Leading edge	SP4010
Side-to-side	SP4011



A: Leading Edge Registration
B: Side-to-side Registration

A133R600.wmf

12.2.2 Registration: ADF

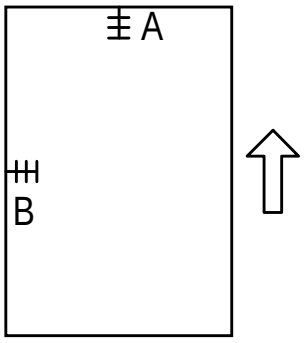


A133R611.wmf

NOTE: Make a temporary test chart as shown above using A3/DLT paper.

1. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
2. Check the registration, and adjust using the following SP modes if necessary. See the ADF manual for details on how to use these SP modes.

	SP mode
Side-to-side Registration	SP6006-1
Leading Edge Registration (Simplex)	SP6006-2
Leading Edge Registration (Duplex: front)	SP6006-3
Leading Edge Registration (Duplex: rear)	SP6006-4

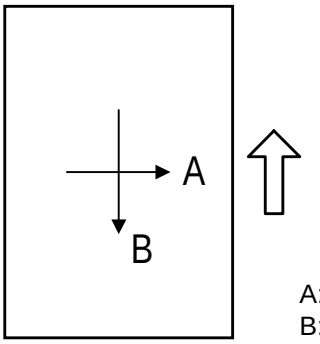


A: Leading Edge Registration
B: Side-to-side Registration

A133R600-2.wmf

12.3 Magnification

NOTE: Use an OS-A3 test chart to perform the following adjustment.



A: Main Scan Magnification
B: Sub Scan Magnification

A133R602.wmf

12.3.1 Main Scan Magnification

1. Place the test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the magnification ratio, and adjust it using the following SP mode if necessary.

SP mode	
Main Scan Magnification	SP2909

12.3.2 Sub Scan Magnification

1. Place the test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the magnification ratio, and adjust it using the following SP mode if necessary.

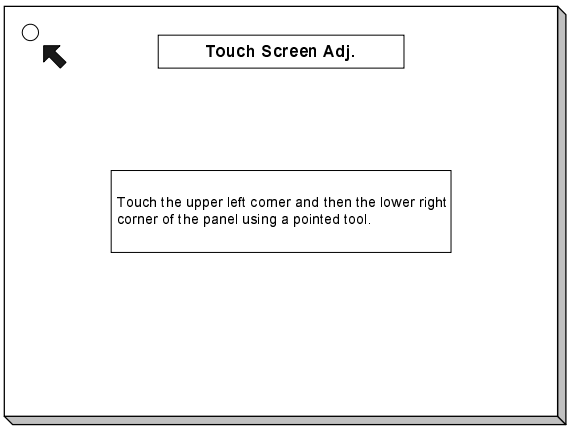
SP mode	
Sub Scan Magnification	SP4008

13. TOUCH SCREEN ADJUSTMENT

After doing a Memory All Clear or when the touch panel sensing mechanism is not working properly, adjust it as follows.

1. Press the following keys in sequence to enter the touch screen adjustment mode.

   [Menu] [1] [9] [9] [3] [C] x 5 [#]



A133R603.wmf

2. The graphic sensing adjustment screen will appear. Touch the upper left corner then the lower right corner of the panel using a pointed tool.
3. Touch a few spots on the LCD touch panel, and confirm that the marker (a small circle) appears on the screen at exactly the same location as the pointed tip. If it does not, touch "Clear" on the adjustment screen, and press the [#] key. Then repeat this procedure.
4. Touch "Enter" on the adjustment screen.
5. Turn the main switch off and back on to store the settings.

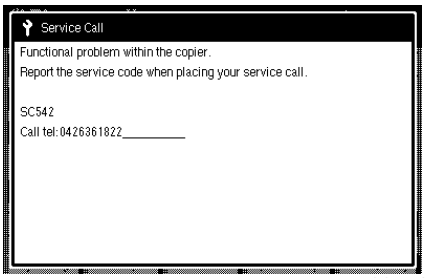
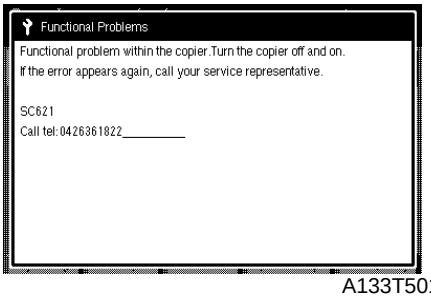
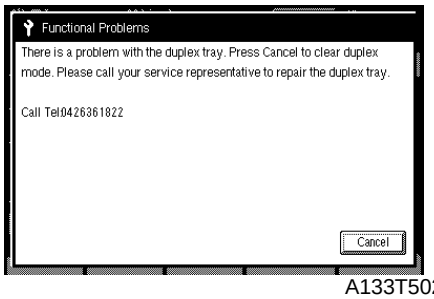
SECTION 6

TROUBLESHOOTING

1. SERVICE CALL CONDITIONS

1.1 SUMMARY

There are 4 levels of service call conditions.

Level	Definition	Display
A	To prevent the machine from being damaged, the SC can only be reset by a service representative (see the note on the next page). The copier cannot be operated at all.	The SC display will not be canceled.  A133T500.tif
B	The SC can be reset by turning the main switch off and on if the SC was caused by a sensor error.	 A133T501.tif
C	The copier can be operated as usual except for the unit related to the service call.	If the user selects a related function, this display appears.  A133T502.tif
D	The SC counter is incremented. The copier can be operated as usual.	The SC will not be displayed.

NOTE: 1) If the problem is related to electrical circuit boards, first disconnect then reconnect the connectors before replacing the PCBs.
2) If the problem is related to motor lock, first check the mechanical load before replacing motors or sensors.
3) To reset a Level A SC, enter SP mode then turn the main switch off and on.
4) When a Level A or B SC occurs while in SP mode, the display does not indicate the SC number. You can recognize that there is an SC condition because no key input is possible.
If this occurs, check the SC number by turning the main switch off and on.

2. SC CODE DESCRIPTIONS

SC101: Lamp regulator error

-Definition- [S]

Detects lamp regulator malfunctions by monitoring the signal for both the exposure lamp on and off signals.

- Possible causes -

- Lamp regulator board defective
- Exposure lamp open
- Optics thermoswitch open
- EX-IPU board defective
- FU1 on the lamp stabilizer board is blown

SC120: Scanner home position error 1

-Definition- [B]

The scanner home position sensor does not detect the on condition during initialization or copying.

- Possible causes -

- Scanner home position sensor defective
- Scanner drive motor defective
- EX-IPU board defective

SC121: Scanner home position error 2

-Definition- [B]

The scanner home position sensor does not detect the off condition during initialization or copying.

- Possible causes -

- Scanner home position sensor defective
- Scanner drive motor defective
- EX-IPU board defective

SC190: EX-IPU board error 1

-Definition- [B]
An error is detected during the ASIC register check.

- Possible cause -
- EX-IPU board defective

SC191: EX-IPU board error 2

-Definition- [B]
The SRAM in the EX-IPU board is defective.

- Possible causes -
- EX-IPU board defective

SC302: Charge current leak

-Definition- [B]
A charge current leak signal is detected.

- Possible causes -
- Charge corona end block damaged
- Charge corona receptacle damaged
- Charge high voltage supply board defective

SC303: Charge wire cleaner error

-Definition- [B]
The charge wire cleaner is detected over the image processing area.

- Possible causes -
- Charge wire cleaner drive motor defective
- Insufficient lubrication for the charge wire cleaner drive mechanism (G501 grease)

SC320: Polygon motor error

-Definition- [B]

The polygon motor does not reach its operating speed within 20 seconds after sending the polygon motor ON signal, or the motor speed does not decrease within 20 seconds after sending the polygon motor OFF signal.

- Possible causes -

- 24V line abnormal (blown fuse condition)
- Polygon motor defective
- Polygon motor driver defective
- Poor connection of the interface harness which connects the polygon motor driver and the EX-IPU board
- EX-IPU board defective
- FU103 on the DC power supply board is blown

SC321: No laser start signal (F-GATE error)

- Definition- [B]

The laser start signal (F-GATE) is not sent within 20 seconds after the copy paper reaches the registration sensor.

- Possible causes -

- BCU board defective
- EX-IPU board defective
- Poor connection of the interface harness which connects the BCU board and the EX-IPU board.

SC322: Laser synchronization error 1

-Definition- [B]

The laser synchronization signal can not be detected by the main scan synchroniziation detector board -1 just after the LD is turned on while the polygon mirror is rotating at operating speed.

- Possible causes -

- Poor connection of the interface harness which connects the laser synchronization detector board -1 and the EX-IPU board
- Laser synchronization detector board -1 out of position
- Laser synchronization detector board -1 defective
- EX-IPU board defective
- LD unit defective

SC323: LD drive current over

-Definition- [B]

The LD drive board applies more than 100 mA to the LD.

- Possible causes -

- LD unit defective (not enough power, due to aging)
- Poor connection of the interface harness which connects the LD unit and the EX-IPU board
- Temperature around the LD unit is too high

SC325: Laser synchronizing signal error 2

-Definition- [D]

The interval of the laser synchronizing signal detected by the main scan synchronization detector board -2 becomes outside the correctable range.

- Possible causes -

- Main scan synchronization detector board -2 defective
- Poor connection of the interface harness which connects the main scan synchronization detector board -2 and the EX-IPU board
- Main scan synchronization detector board -2 out of position
- EX-IPU board defective
- Polygon motor defective

SC350: ID sensor error

-Definition- [B]

1. Vsg falls out of the adjustment target (4 ± 0.2 V) during Vsg checking
2. Vsp>2.5V or Vsg<2.5V is detected twice consecutively during copying.

- Possible causes -

- ID sensor board defective
- Dirty ID sensor board
- BCU board defective
- High voltage control board defective

SC360: Hard disk drive error 1

-Definition- [B]
The EX-IPU board does not receive the response signal from the HDD.

- Possible causes -
- Poor connection of the interface harness which connects the EX-IPU board and the HDD.
- HDD power cord not connected properly.
- HDD defective
- SCSI controller on the EX-IPU defective.

SC361: Hard disk drive error 2

-Definition- [B]
The image data stored in the HDD cannot be output properly.

- Possible causes -
- EX-IPU board defective

SC390: TD sensor error

-Definition- [B]
1. TD sensor output voltage falls out of the adjustment target (2.5 ± 0.1 V) during the Vt check.
2. Vt-Vtref>0.6V is detected 10 consecutive times even though toner is detected by the toner end sensor.
3. Vt<0.5 or Vt>4.0 is detected.

- Possible causes -
- TD sensor abnormal
- BCU board defective

SC391: Development bias leak

-Definition- [B]
A development bias leak signal is detected.

- Possible causes -
- Sleeve roller receptacle damage
- Development bias power pack defective

SC401: Transfer belt error

-Definition- [B]

A transfer belt current leak signal is detected.

- Possible causes -

- Transfer high voltage supply board defective
- Transfer belt position sensor defective

SC440: Main motor lock

-Definition- [B]

A main motor lock signal is detected for more than 2 seconds.

- Possible causes -

- Too much load on the drive mechanism
- Main motor defective

SC490: Ozone fan motor lock/Exhaust fan motor lock

-Definition- [B]

A fan motor lock signal is detected for more than 0.5 second from either fan.

- Possible causes -

- Ozone fan motor defective
- Exaust fan motor defective
- Poor connection of the fan motor connector
- Something is stuck in the fan motor

SC501: Main body tray lift motor malfunction

SC502: Paper tray unit 1st tray lift motor malfunction

SC503: Paper tray unit 2nd tray lift motor malfunction

SC504: Paper tray unit 3rd tray lift motor malfunction

-Definition- [C]

- The paper upper limit sensor is not actuated after the tray lift motor has been on for 10 seconds.
- The pick-up roller solenoid does not contact the top sheet of paper.

- Possible causes -

- Upper limit sensor defective
- Tray lift motor defective
- Pick-up roller solenoid defective

SC506: Paper tray unit main motor lock (A549 optional paper tray unit only)

-Definition- [C]

- A paper tray unit motor lock signal is detected.
- A synchronization error is detected for 20 ms during rotation.

- Possible causes -

- Paper tray unit main motor defective
- Interface board defective
- Pick-up roller solenoid defective

SC507: LCT lift motor malfunction

-Definition- [C]

1. The LCT upper limit sensor is not actuated after the LCT lift motor has been on for 15.0 seconds.
2. The LCT lower limit sensor is not actuated after the LCT lift motor has been on for 15.0 seconds.
3. The LCT upper limit sensor is not actuated after the LCT lift motor has been on for 1.5 seconds to lift up paper during copying.
4. The LCT upper limit sensor stays actuated after the LCT lift motor has been on for 1.5 seconds to lower the LCT tray.
5. Both the LCT upper and lower limit sensors are actuated when the LCT lift motor starts to lift the LCT tray.
6. The LCT upper limit sensor is outputting an OFF signal when the LCT pick-up solenoid is OFF.

- Possible causes -

- LCT upper limit sensor defective
- LCT lower limit sensor defective
- LCT lift motor defective
- LCT interface board defective
- BCU board defective
- LCT cover switch defective

SC521: Duplex side fence drive motor error

-Definition- [C]

- The side fence jogger home position sensor remains de-actuated for 5.0 seconds when the jogger home position initialization procedure is performed.
- The side fence jogger home position sensor remains actuated for 0.5 second when moving away from home position.

- Possible causes -

- Side fence jogger home position sensor defective
- Side fence jogger motor defective
- Duplex control board defective

SC524: Duplex end fence drive motor error

-Definition- [C]

- The end fence jogger home position sensor remains de-actuated for 8.0 seconds when the jogger home position initialization procedure is performed.
- The end fence jogger home position sensor remains actuated for 0.5 second when moving away from home position.

- Possible causes -

- End fence jogger home position sensor defective
- End fence jogger motor defective
- Duplex control board defective

SC541: Fusing thermistor open

-Definition- [A]

The fusing temperature detected by the thermistor was below 7°C for 10 seconds.

- Possible cause -

- Fusing thermistor open
- Fusing lamp open
- Poor thermistor connection

SC542: Fusing temperature warm-up error

-Definition- [A]

The fusing temperature does not reach the fusing standby temperature within 135.0 seconds after the main switch is turned on.

- Possible causes -

- Fusing thermistor defective or out of position
- Fusing lamp open
- Fusing thermofuse open
- BCU board defective
- AC drive board defective

SC543: Fusing overheat error 1

-Definition- [A]

A fusing temperature of over 231°C is detected for 5 seconds by the fusing thermistor.

- Possible causes -

- Fusing thermistor defective
- BCU board defective
- AC drive baord defective

SC545: Fusing overheat error 2

-Definition- [A]

The fusing lamp stays on at full power for 30.0 seconds while in the stand-by condition after warm-up is completed.

- Possible causes -

- Fusing thermistor out of position

SC546: Fusing ready temperature malfunction

-Definition- [A]

The fusing temperature goes 20 °C below or 20 °C over the stand-by temperature after warm-up is completed.

- Possible causes -

- Poor thermistor connection
- Poor connection of the sliding connector between the fusing unit and the rear of the machine

SC547: Zero cross signal malfunction

-Definition- [A]

Zero cross signals are not detected within a certain period.

- Possible causes -

- AC drive board defective
- BCU board defective

SC600: Communication error between SCU and operation panel

-Definition- [B]

The SCU board cannot communicate with the operation panel CPU properly.

- Possible causes -

- Poor connection
- SCU board defective
- Operation panel board defective

SC601: Communication error between BCU and EX-IPU

-Definition- [B]

The BCU board cannot communicate with the EX-IPU board properly.

- Possible causes -

- Poor connection of the interface harness which connects the BCU board and the EX-IPU board

SC602: Communication error between BCU and fusing control unit

-Definition- [B]

The BCU board cannot communicate with the fusing control unit properly.

- Possible causes -

- BCU board defective

SC604: Communication error between BCU and high voltage control board

-Definition- [B]

The BCU board cannot communicate with the high voltage control board properly.

- Possible causes -

- Poor connection of the interface harness which connects the BCU baord and the high voltage control baord.
- High voltage control board defective

SC605: Communication error between SCU and BCU

-Definition- [B]
The SCU board cannot communicate with the BCU board properly.

- Possible causes -
- Poor connection
- SCU board defective
- BCU board defective

SC620: Communication error between BCU and ARDF

-Definition- [B]
The BCU board cannot start communication with the ARDF properly.

- Possible causes -
- Poor connection
- BCU board defective
- DF main board defective

SC621: Communication error between BCU and finisher

-Definition- [B]
The BCU board cannot start communication with the finisher properly.

- Possible causes -
- Poor connection
- BCU board defective
- Finisher main control board defective

SC623: Communication error between BCU and paper tray unit

-Definition- [B]
The BCU board cannot start communication with the paper tray unit properly.

- Possible causes -
- Poor connection
- BCU board defective
- Paper tray unit defective

SC720: Finisher transport drive motor error

-Definition- [B]

An abnormal motor condition is detected from the finisher transport drive motor.

- Possible causes -

- Finisher transport drive motor defective
- Finisher main control board defective

SC721: Finisher tray lift/shift motor error

-Definition- [B]

An abnormal motor condition is detected from either the finisher tray lift or shift motor.

- Possible causes -

- Finisher tray lift motor defective
- Finisher tray shift motor defective
- Finisher main control board defective

SC722: Finisher jogger motor error

-Definition- [B]

- The finisher jogger home position sensor remains de-actuated for 800 ms when returning to home position.
- The finisher jogger home position sensor remains actuated for 100 ms when moving away from home position.

- Possible causes -

- Finisher jogger motor defective
- Finisher main control board defective

SC723: Finisher stack feed-out motor error

-Definition- [B]

An abnormal motor condition is detected from the finisher stack feed-out motor.

- Possible causes -

- Finisher stack feed-out motor defective
- Finisher main control board defective

SC724: Finisher staple drive/stable motor error

-Definition- [B]

An abnormal motor condition is detected from either the finisher staple drive or staple motor.

- Possible causes -

- Finisher staple drive motor defective
- Finisher staple motor defective
- Finisher main control board defective

SC900: Total counter error

-Definition- [B]

The total counter is not working properly.

- Possible causes -

- Total counter defective
- CN403 on the SCU board not connected properly

3. ELECTRICAL COMPONENT DEFECTS

3.1 SENSORS

Component (Symbol)	CN	Condition	Symptom
By-pass Feed Paper Width (S1)	209-9~12 (BCU)	Open	The copier does not turn on.
		Shorted	The CPU cannot detect the proper paper size.
By-pass Feed Paper End (S2)	209-7 (BCU)	Open	The Paper End indicator lights even if paper is placed on the by-pass feed table.
		Shorted	The Paper End indicator does not light even if there is no paper on the by-pass feed table.
Tray Paper End (S3)	213-A2 (BCU)	Open	The Paper End indicator lights even if paper is placed on the by-pass feed table.
		Shorted	The Paper End indicator does not light even if there is no paper on the by-pass feed table.
Upper Relay (S4)	214-B12 (BCU)	Open	The Check Paper Path indicator will light whenever a copy is made.
		Shorted	The Check Paper Path indicator lights even if there is no paper.
Tray Upper Limit (S5)	213-A8 (BCU)	Open	A related SC code will be displayed before the pick-up solenoid activates.
		Shorted	The tray bottom plate does not rise, and a related SC code will be displayed.
Lower Relay (S6)	214-B9 (BCU)	Open	The Check Paper Path indicator will light whenever a copy is made.
		Shorted	The Check Paper Path indicator lights even if there is no paper.
LCT Lower Limit (S7)	218-10 (BCU)	Open	The LCT bottom plate does not lower.
		Shorted	When the bottom plate is lowered, it locks at the lowest position.
LCT Paper End (S8)	223-2 (BCU)	Open	The Paper End indicator lights even if there is paper in the LCT.
		Shorted	The Paper End indicator does not light even if there is no paper.
LCT Upper Limit (S9)	217-5 (BCU)	Open	The bottom plate does not rise even if paper is placed in the LCT.
		Shorted	The bottom plate rises and locks at the upper position.
Registration (S10)	214-A2 (BCU)	Open	The Check Paper Path indicator will light whenever a copy is made.
		Shorted	The Check Paper Path indicator lights even if there is no paper.
Image Density (ID) (S11)	210-A8 (BCU)	Open	SC350 is displayed.
		Shorted	SC350 is displayed.
Toner Density (TD) (S12)	210-B3 (BCU)	Open	SC390 is displayed.
		Shorted	SC390 is displayed.

Component (Symbol)	CN	Condition	Symptom
Scanner HP (S13)	505-1 (EX-IPU)	Open	SC121 is displayed.
		Shorted	SC120 is displayed.
Original Length (S14)	516-6 (EX-IPU)	Open	The CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
Original Length-2 (S15)	516-3 (EX-IPU)	Open	The CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
Fusing Exit(S16)	210-B9 (BCU)	Open	The Check Paper Path indicator will light whenever a copy is made.
		Shorted	The Check Paper Path indicator lights even if there is no paper.
Platen Cover (S17)	516-2 (EX-IPU)	Open	APS and ARE do not function properly.
		Shorted	No symptom
Toner End (S18)	210-B6 (BCU)	Open	Toner is added even if there is a sufficient amount of toner inside the toner supply unit.
		Shorted	Toner is not supplied even if there is no toner inside the toner supply unit.
Auto Response (S19)	414-2 (SCU)	Open	The copier does not exit the "Energy Saver" mode even if an operator approaches the machine.
		Shorted	"Energy Saver" mode does not work.
Transfer Belt Position (S20)	211-A8 (BCU)	Open	No symptom
		Shorted	SC401 is displayed.
Original Width (S21)	505-6~8 (EX-IPU)	Open	The CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
Duplex Paper End (S22)	215-4 (BCU)	Open	"Copies Left In The Duplex Tray" is displayed or the Paper Jam Z indicator lights even if there is no paper in the duplex tray.
		Shorted	Only one rear side copy is made regardless of the quantity of copies required.
Duplex Turn (S23)	215-6 (BCU)	Open	The machine indicates that originals should be reset.
		Shorted	"Copies Left In The Duplex Tray" is displayed or the Paper Jam Z indicator lights even if there is no paper in the duplex tray.
Duplex Entrance (S24)	215-5 (BCU)	Open	"Copies Left In The Duplex Tray" is displayed or the Paper Jam Z indicator lights even if there is no paper in the duplex tray.
		Shorted	The Check Paper Path indicator lights even if there is no paper.
Side Fence Jogger HP (S25)	215-2 (BCU)	Open	SC521 is displayed.
		Shorted	SC521 is displayed.
End Fence Jogger HP (S26)	215-3 (BCU)	Open	SC524 is displayed.
		Shorted	SC524 is displayed.

Component (Symbol)	CN	Condition	Symptom
Toner Overflow (S27)	210-A4 (BCU)	Open	"Used Toner Bottle Nearly Full" is indicated, even if the bottle is not full.
		Shorted	Toner overflow cannot be detected even if the bottle is full.
By-pass Relay (S28)	217-8 (BCU)	Open	The Check Paper Path indicator will light whenever a copy is made.
		Shorted	The Check Paper Path indicator lights even if there is no paper.

3.2 SWITCHES

Component (Symbol)	CN	Condition	Symptom
By-pass Feed Table (SW1)	209-4 (BCU)	Open	By-pass feed cannot be selected.
		Shorted	The by-pass feed indicator is lit even if the by-pass feed table is closed.
Tray Down (SW2)	218-6 (BCU)	Open	The LCT bottom plate does not lower.
		Shorted	The LCT bottom plate lowers even if there is paper in the LCT.
Tray Paper Size (SW3)	213-B2~6 (BCU)	Open	The CPU cannot detect the proper paper size, and misfeeds may occur when a copy is made.
		Shorted	
LCT (SW4)	218-3 (BCU)	Open	The LCT bottom plate lowers even if there is paper in the LCT.
		Shorted	The LCT bottom plate does not rise even if the cover is closed.
LCT Cover (SW5)	218-12 (BCU)	Open	SC507 is displayed or the LCT bottom plate does not rise or lower.
		Shorted	
Main (SW6)	–	Open	The copier does not turn on.
		Shorted	The copier does not turn off.
Front Cover Safety (SW7)	–	Open	"Doors/Covers Open" is not displayed even if the front cover is opened.
		Shorted	"Doors/Covers Open" is displayed even if the front cover is closed.

4. BLOWN FUSE CONDITIONS

Fuse	Rating		Symptom when turning on the main switch
	115 V	220 ~ 240 V	
DC Power Supply Board			
FU101	8 A/125 V	6.3 A/250 V	No response.
FU102	8 A/125 V	8 A/125 V	"Close the indicated doors/covers" is displayed on the LCD.
FU103	6.3 A/125 V	6.3 A/125 V	SC320 is displayed.
FU104	6.3 A/125 V	6.3 A/125 V	"Close the indicated doors/covers" is displayed on the LCD.
Lamp Stabilizer Board			
FU1	5 A/125 V	3.15 A/250 V	SC101 is displayed.

AD3 Point to Point 1/2

EXIPU - SBU			
CN507		CN508	
-1	CGND	-1	CGND
-2	Voult1	-2	TC1 1
-3	CGND	-3	CGND
-4	Vout2	-4	TC2 1
-5	CGND	-5	CGND
-6	CGND	-6	RS1
-7	VCA	-7	CGND
-8	VCA	-8	RS2
-9	VCA	-9	CGND
-10	CGND	-10	XTC1L 1
-11	CGND	-11	CGND
-12	TG2 1	-12	XTC2L 1
-13	CGND	-13	CGND
-14	VCC	-14	-
-15	VCC		

Symbol Table

- AC Line
- DC Line
- Puls
- Signal Direction
- Active High
- Active Low
- [ ] Voltage

AC Drive Board (PCB2) See 2/2

Relay Board (See 2/2) (PCB19) — RA

Main Switch (See 2/2) — RA — (SW6)

By-pass Relay — CL 8

Fusing Unit — Fusing Lamp (L2), Fuse(TF1)

Thermoswitch (TS1)

SBU (PCB10) — CN550, CN551, CN507, CN508

Exposure Lamp L1

Lamp Stebilizer (PCB11) — CN1, CN4, CN600, CN602

Polygonal Mirror — M 4

Laser Synchronization Detector 2 (PCB13)

Laser Synchronization Detector 1 (PCB12)

Optics Exhoust Fan — M6

IPU Fan — M7

Original Length SN2 — S15

Scanner Drive — M 10

Scanner Drive (PCB8) — CN612, CN611, CN610

Scanner H.P SN — S13

Original Width SN — S21

Platen Cover SN — S17

Original Length SN — S14

Hard Disk (See Table 1) — CN707, CN708

Hard Disk (HDD) — CN960

EXIPU (PCB9)

LD Drive (PCB20) — CN501, CN561, CN569

Front Cover Safety SW (SW7) — LDSW, VCCA

Ozone Fan — M9

Main Motor — M1

Transfer Belt Position — S20

Exhaust Fan — M8

Transfer Belt Lift — CL

Upper Relay — S4

Lower Relay — S6

By-pass Pick-up — SOL 1

Junction Gate Sol — SOL 2

LCT Interface (PCB18) — CN701

LCT Unit

LCT Paper End SN — S8

Tray Down SW — SW2

Lower Limit — S7

LCT Cover SW — (SW5)

LCT Lift — M 5

LCT Cover SW (SW5)

(SW4) LCT SW

Fusing Exit SN — S16

Toner End SN — S18

TD SN — S12

Development Unit

Development Bias Power Pack — PCB 15, CN185

DUPLEX UNIT

- Duplex Feed — M 11
- Side Fence Jogger — M 13
- End Fence Jogger — M 12

Side Fence H.P — S25

End Fence H.P — S26

Paper End — S22

Entrance — S24

Turn — S23

Paper End — S3

Pick-up — SOL 4

Tray Upper Limit — S5

Separation — SOL 5

Tray Paper Size — SW3

Tray Lift — M3

Paper Feed — CL 7

Registration — S10

Toner Supply — CL 1

Development — CL 2

Relay — CL 6

Registration — CL 4

By-pass Feed — CL 5

By-pass Table — SW1

By-pass Paper End — S2

By-pass Paper Size — S1

Toner Bottle Drive — M2

Toner Overflow — S27

ID SN — S11

Charge Inlet Fan — FAN (M15)

LCT Pick-up — SOL 3

LCT Upper Limit SN — S9

By-pass Relay SN — S28

BCU (PCB4)

Transfer High Voltage

Quenching Lamp — L3

Charge High Voltage Supply — PCB5

PCB 14

Charge Corona Cleaning Motor (Option)

High Voltage Control (PCB6)

DC Power Supply Board (PCB3) See 2/2

Operation Panel (PCB7) See 2/2

-A1 to -A10
-B1 to -B10

SCU (PCB1) See 2/2

ADF (Option) See 2/2

FINISHER (Option) See 2/2

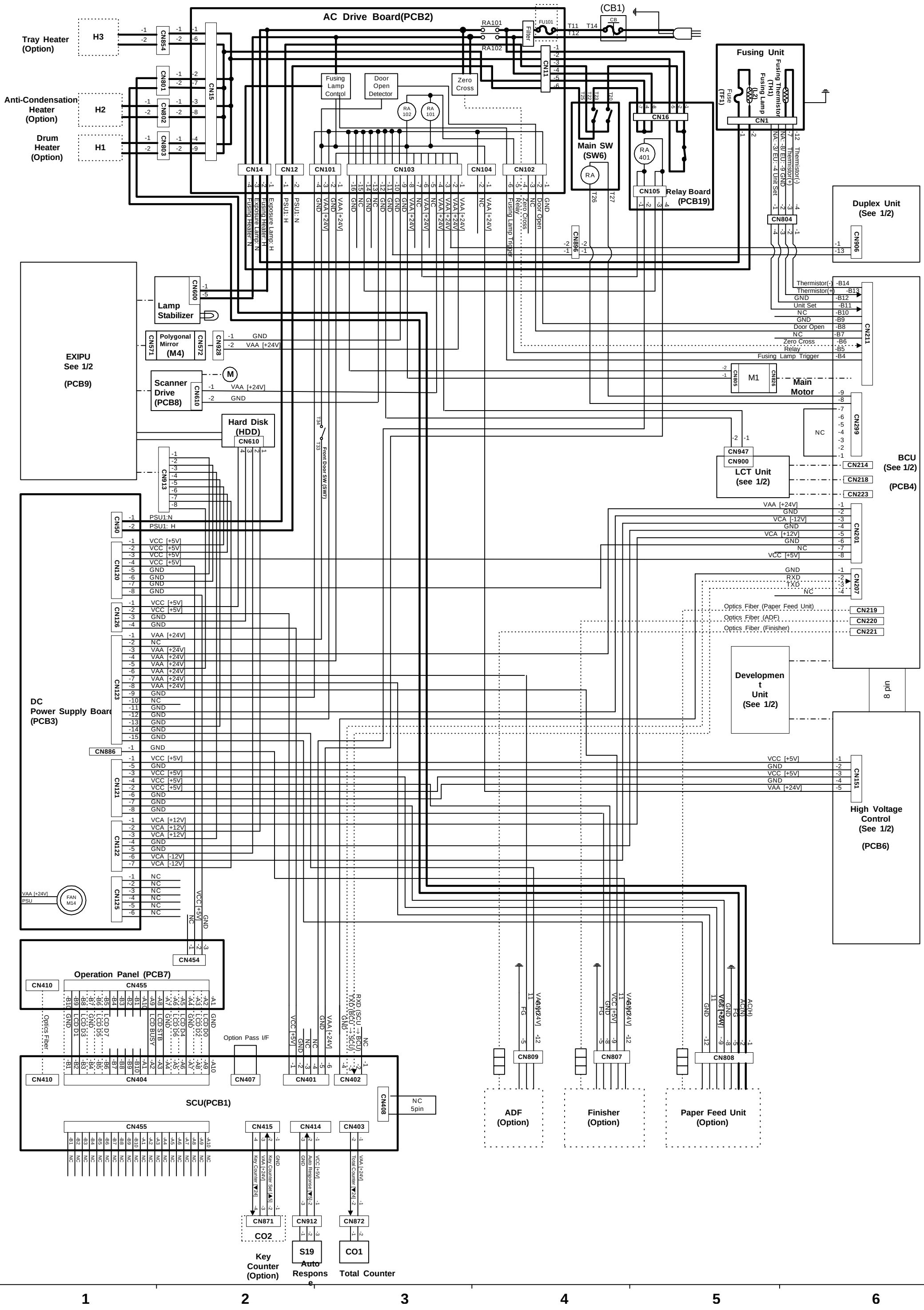
Paper Feed Unit (Option) See 2/2

Optics Fiber (Paper Feed Unit) — CN219
Optics Fiber (ADF) — CN220
Optics Fiber (Finisher) — CN221

Table 1

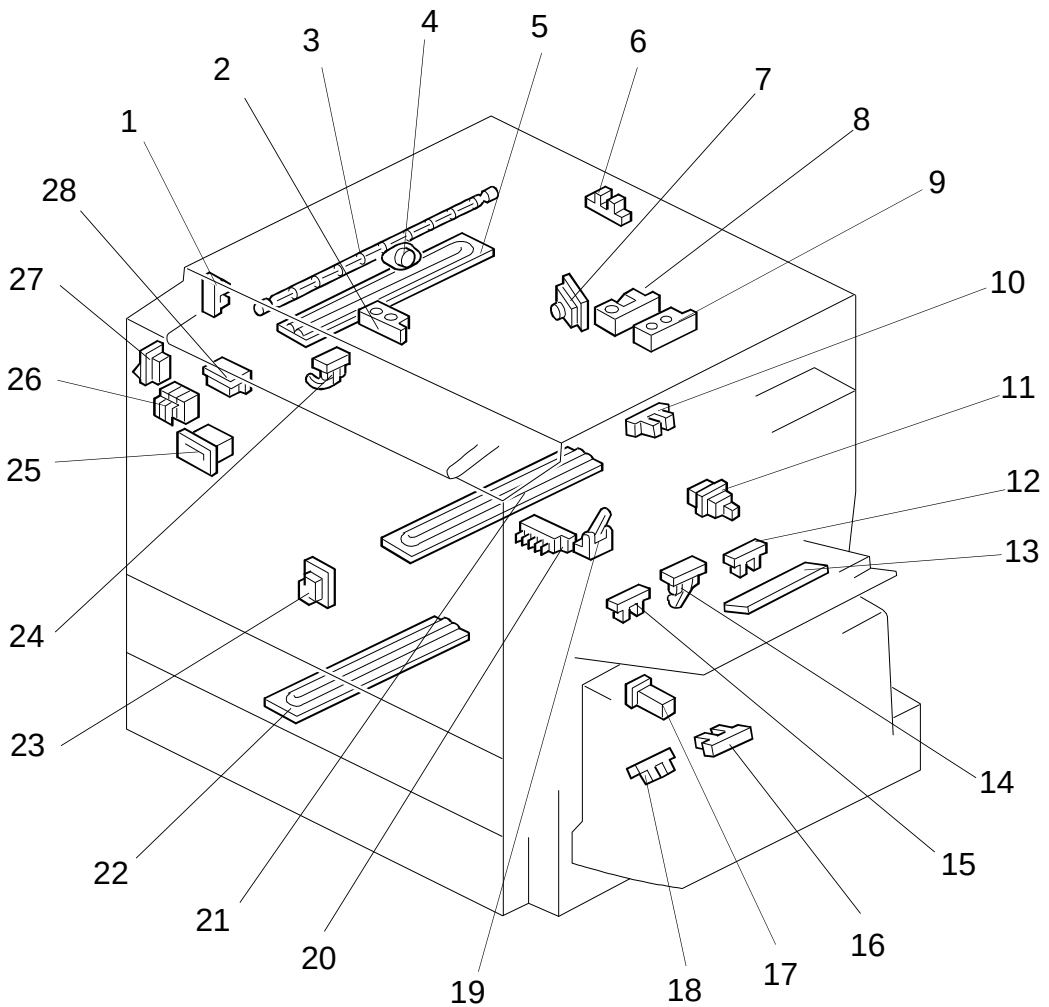
EXIPU - Hard Disk			
CN707			
1	GND	26	NC
2	SD0	27	GND
3	GND	28	GND
4	SD1	29	GND
5	GND	30	GND
6	SD2	31	GND
7	GND	32	/ATN
8	SD3	33	GND
9	GND	34	GND
10	SD4	35	GND
11	GND	36	/BSY
12	SD5	37	GND
13	GND	38	/ACK
14	SD6	39	GND
15	GND	40	/RST
16	SD7	41	GND
17	GND	42	/MSG
18	SDP	43	GND
19	GND	44	/SEL
20	GND	45	GND
21	GND	46	/CD
22	GND	47	GND
23	GND	48	/REQ
24	GND	49	GND
25	GND	50	/IO

AD3 Point to Point 2/2



1 2 3 4 5 6

COPIER (A133) ELECTRICAL COMPONENTS



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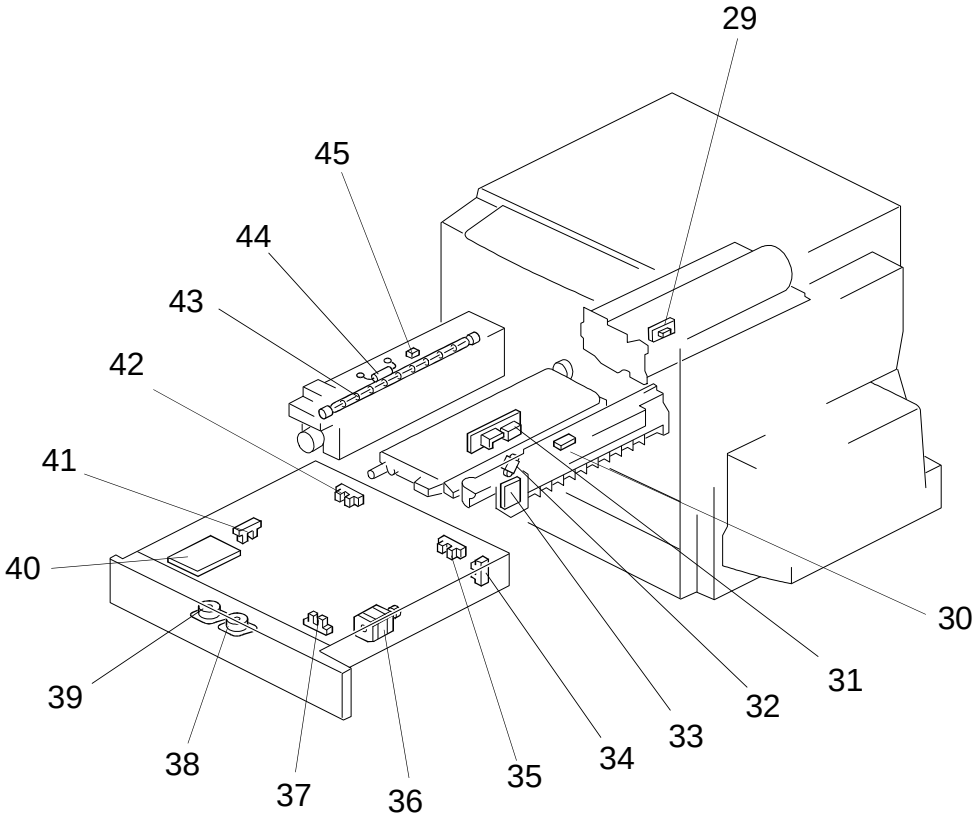

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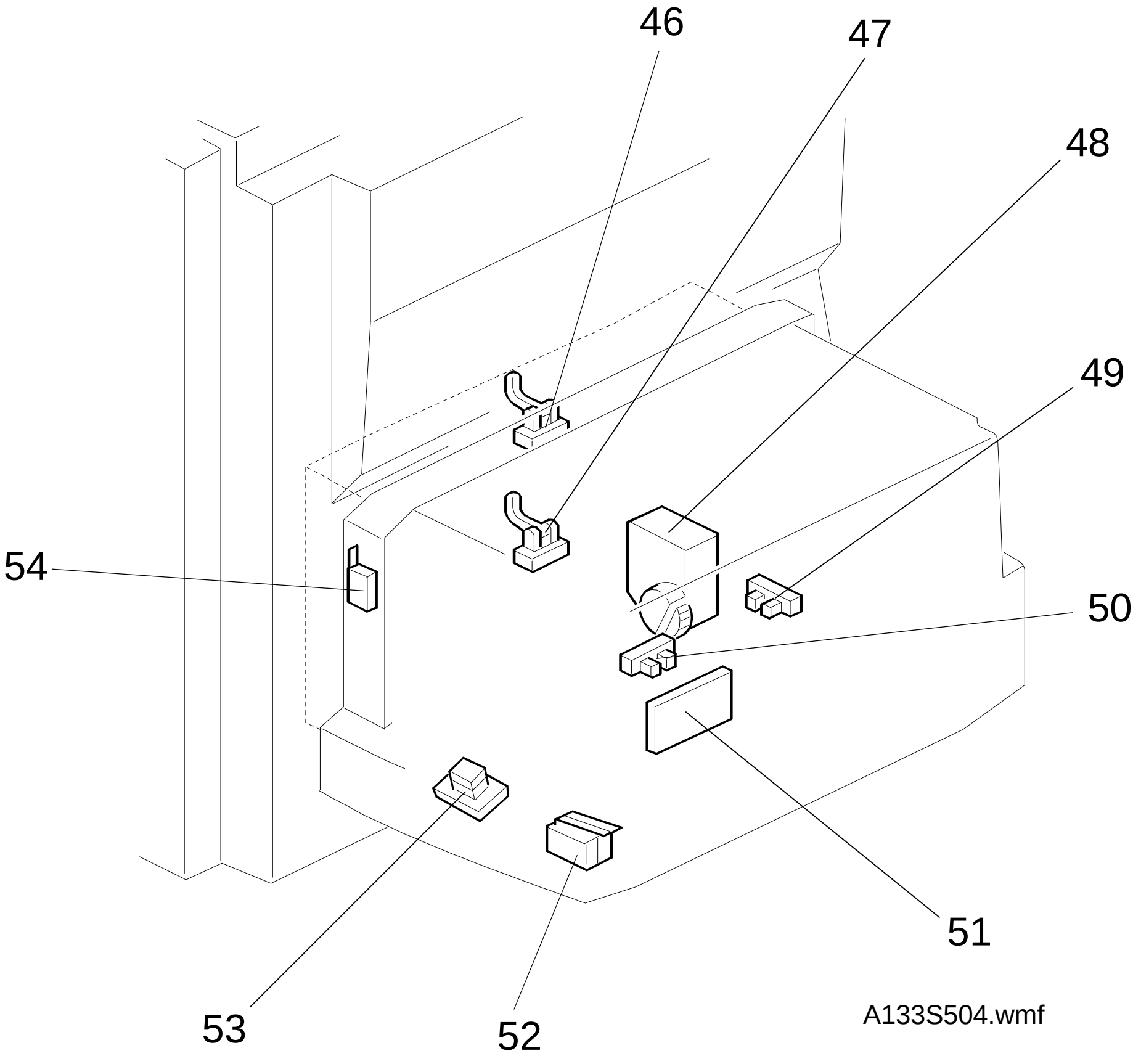
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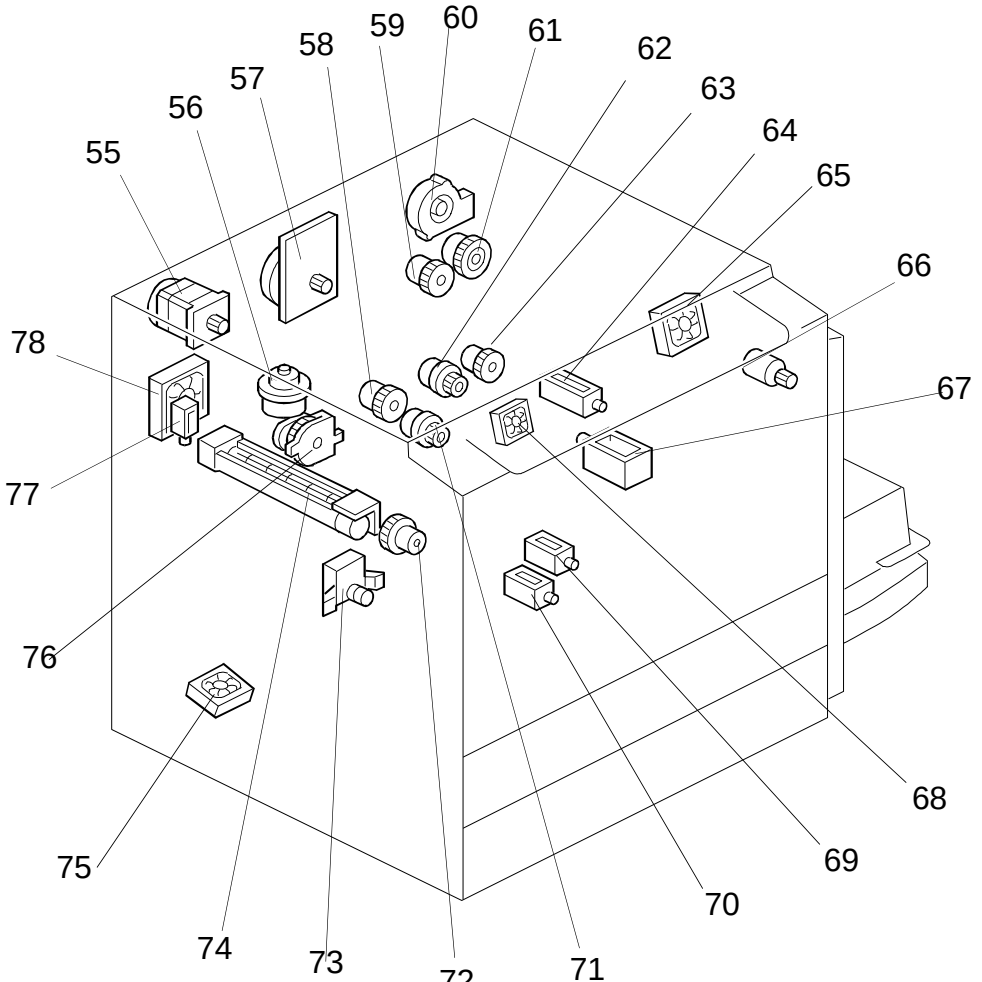
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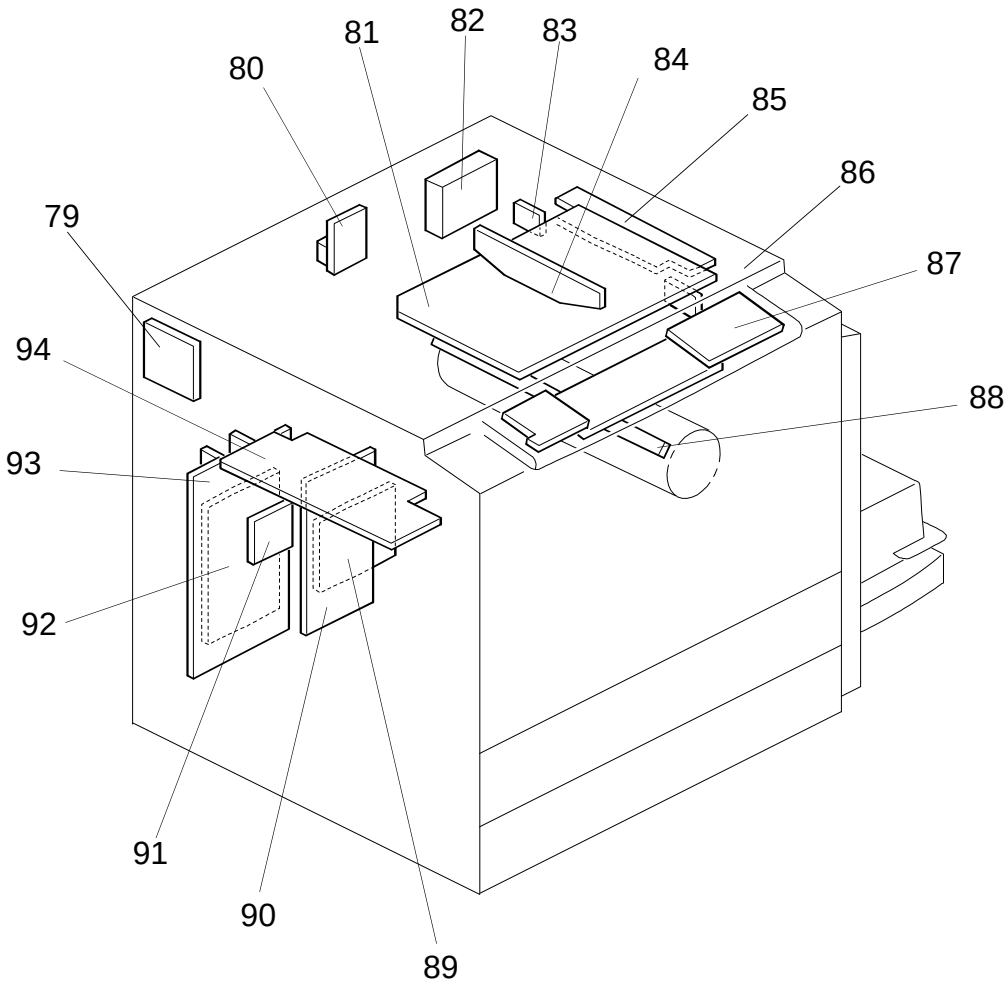
A133S502.wmf



A133S505.wmf

Symbol	Index No.	Description	P-to P
Printed Circuit Boards			
PCB1	90	SCU	H1 (1/2), G2 (2/2)
PCB2	89	AC Drive	A2 (1/2), A3 (2/2)
PCB3	92	DC Power Supply	G1 (1/2), E1 (2/2)
PCB4	93	BCU	D5 (1/2), D6 (2/2)
PCB5	80	Charge High Voltage Supply	G5 (1/2)
PCB6	85	High Voltage Control	H5 (1/2), F6 (2/2)
PCB7	87	Operation Panel	H1 (1/2), G1 (2/2)
PCB8	79	Scanner Drive	D2 (1/2), C2(2/2)
PCB9	81	EX-IPU	D2 (1/2), C1 (2/2)
PCB10	84	SBU	B1 (1/2)
PCB11	94	Lamp Stabilizer	B2 (1/2), C2 (2/2)
PCB12	86	Main Scan Synchronization Detector - 1	B2 (1/2)
PCB13	83	Main Scan Synchronization Detector - 2	C2 (1/2)
PCB14	31	Transfer High Voltage	G6 (1/2)
PCB15	33	Development Bias Power Pack	H3 (1/2)
PCB16	40	Duplex Control	A6 (1/2)
PCB17	N/A	Liquid Crystal Display	N/A
PCB18	51	LCT Interface	F2 (1/2)
PCB19	91	Relay Board	A4 (1/2) B5 (2/2)
PCB20	7	Laser Diode Drive	E2 (1/2)
Motors			
M1	57	Main	C3 (1/2), C5 (2/2)
M2	66	Toner Bottle Drive	F6 (1/2)
M3	73	Tray Lift	D6 (1/2)
M4	56	Polygonal Mirror	B2 (1/2), C2 (2/2)
M5	48	LCT Lift	F3 (1/2)
M6	74	Optics Exhaust Fan	C2 (1/2)
M7	65	IPU Fan	C2 (1/2)
M8	78	Exhaust Fan	C3 (1/2)
M9	60	Ozone Fan	C3 (1/2)
M10	55	Scanner Drive	C2 (1/2)
M11	36	Duplex Feed	A6 (1/2)
M12	39	End Fence Jogger	A6 (1/2)
M13	38	Side Fence Jogger	A6 (1/2)
M14	75	DC Drive Board Fan	F7 (2/2)
M15	68	Charge Inlet Fan	F6 (1/2)
Sensors			
S1	13	By-pass Feed Paper Width	E6 (1/2)
S2	15	By-pass Feed Paper End	E6 (1/2)
S3	18	Tray Paper End	C6 (1/2)
S4	46	Upper Relay	D3 (1/2)
S5	16	Tray Upper Limit	C6 (1/2)

Symbol	Index No.	Description	P-to P
S6	47	Lower Relay	E3 (1/2)
S7	49	LCT Lower Limit	F3 (1/2)
S8	50	LCT Paper End	F3 (1/2)
S9	12	LCT Upper Limit	G6 (1/2)
S10	19	Registration	D6 (1/2)
S11	29	Image Density (ID)	F6 (1/2)
S12	30	Toner Density (TD)	G3 (1/2)
S13	1	Scanner HP	F2 (1/2)
S14	8	Original Length-1	F2 (1/2)
S15	9	Original Length-2	C2 (1/2)
S16	24	Fusing Exit	G4 (1/2)
S17	6	Platen Cover	F2 (1/2)
S18	32	Toner End	G3 (1/2)
S19	28	Auto Response	H2 (2/2)
S20	10	Transfer Belt Position	C4 (1/2)
S21	2	Original Width	F2 (1/2)
S22	34	Duplex Paper End	B6 (1/2)
S23	35	Duplex Turn	B6 (1/2)
S24	42	Duplex Entrance	B6 (1/2)
S25	37	Side Fence Jogger HP	B6 (1/2)
S26	41	End Fence Jogger HP	B6 (1/2)
S27	23	Toner Overflow	F6 (1/2)
S28	14	By-pass Relay	G6 (1/2)
Switches			
SW1	11	By-pass Feed Table	E6 (1/2)
SW2	53	Tray Down	F3 (1/2)
SW3	20	Tray Paper Size	C6 (1/2)
SW4	54	LCT	E3 (1/2)
SW5	52	LCT Cover	F3 (1/2)
SW6	27	Main	A4 (1/2), B4 (2/2)
SW7	26	Front Cover Safety	D2 (1/2)
Magnetic Clutches			
CL1	61	Toner Supply	D6 (1/2)
CL2	59	Development	D6 (1/2)
CL3	76	Transfer Belt Lift	D3 (1/2)
CL4	58	Registration	E6 (1/2)
CL5	63	By-pass Feed	E6 (1/2)
CL6	71	Relay	D6 (1/2)
CL7	72	Paper Feed	D6 (1/2)
CL8	62	By-pass Relay	B4 (1/2)
Solenoids			
SOL1	67	By-pass Pick-up	E3 (1/2)
SOL2	77	Junction Gate	E3 (1/2)

Symbol	Index No.	Description	P-to P
SOL3	64	LCT Pick-up	F6 (1/2)
SOL4	69	Pick-up	C6 (1/2)
SOL5	70	Separation	C6 (1/2)
Lamps			
L1	3	Exposure	B2 (1/2)
L2	43	Fusing	B3 (1/2)
L3	88	Quenching	G5 (1/2)
Heaters			
H1	21	Drum (option)	B1 (2/2)
H2	5	Optics Anti-condensation (option)	B1 (2/2)
H3	22	Tray (option)	A1 (1/2)
Thermistors			
TH1	45	Fusing	A6 (2/2)
Thermofuses			
TF1	44	Fusing	B3 (1/2), A5 (2/2)
Thermoswitch			
TS1	4	Exposure Lamp	B2 (1/2)
Counters			
CO1	25	Total	H3 (2/2)
CO2	N/A	Key (option)	H2 (2/2)
Others			
CB1	17	Circuit Breaker (220 ~ 240V machines only)	A4 (2/2)
HDD	82	Hard Disk Drive	F2 (1/2), C2 (2/2)

RICOH

AFICIO 400 (A133)

PARTS CATALOG

First Edition Aplil 1996

RICOH COMPANY,LTD

PARTS CATALOG

INTRODUCTION

This chapter instructs you the numbers and names of parts on this machine.

INDEX to PARTS CATALOG

AFICIO400	**(A133)**
DF61	**(A548)**
PS280/PS290	**(A550/A549)**
SR700	**(A612)**

AFICIO400 (A133)

PARTS CATALOG

INTRODUCTION

This chapter instructs you the numbers and names of parts on this machine.

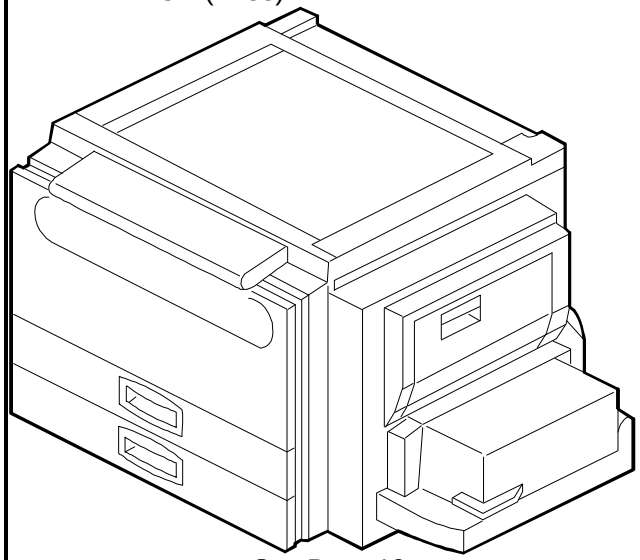
INDEX to PARTS CATALOG

Location of Unit 3
1.EXTERIOR (A133) 10
2.PLATENCOVER (A133) 12
3.PAPER TRAY (A133) 14
4.TRAY PAPER FEED (A133) 16
5.BY-PASS FEED UNIT 1 (A133) 18
6.BY-PASS FEED UNIT 2 (A133) 20
7.BY-PASS FEED UNIT 3 (A133) 22
8.LCT UNIT 1 (A133) 24
9.LCT UNIT 2 (A133) 26
10.VERTICAL TRANSPORT SECTION (A133) 28
11.PAPER REGISTRATION (A133) 30
12.OPTICS SECTION 1 (A133) 32
13.OPTICS SECTION 2 (A133) 34
14.OPTICS SECTION 3 (A133) 36
15.LASER SECTION (A133) 38
16.CHARGE CORONA SECTION (A133) 40
17.TONNER BOTTLE SECTION (A133) 42
18.DEVELOPMENT UNIT 1 (A133) 44
19.DEVELOPMENT UNIT 2 (A133) 46
20.DRUM UNIT (A133) 48
21.CLEANING UNIT (A133) 50
22.TRANSFER BELT UNIT (A133) 52
23.FUSING UNIT 1 (A133) 54
24.FUSING UNIT 2 (A133) 56
25.PAPER EXIT SECTION (A133) 58
26.DUPLEX UNIT 1 (A133) 60
27.DUPLEX UNIT 2 (A133) 62
28.DUPLEX UNIT 3 (A133) 64
29.DRIVE SECTION 1 (A133) 66
30.DRIVE SECTION 2 (A133) 68
31.DRIVE SECTION 3 (A133) 70
32.ELECTRICAL SECTION 1 (A133) 72
33.ELECTRICAL SECTION 2 (A133) 74
34.ELECTRICAL SECTION 3 (A133) 76
35.ELECTRICAL SECTION 4 (A133) 78
36.FRAME SECTION 1 (A133) 80
37.FRAME SECTION 2 (A133) 82

38.500 COPY TRAY (A615) 84
39.SCU BOARD (A133) 86
40.BCU BOARD (A133) 88
41.IPU BOARD (A133) 92
42.DECAL AND DOCUMENT (A133) 100
43.SPECIAL TOOLS (A133) 102
PARTS INDEX 105

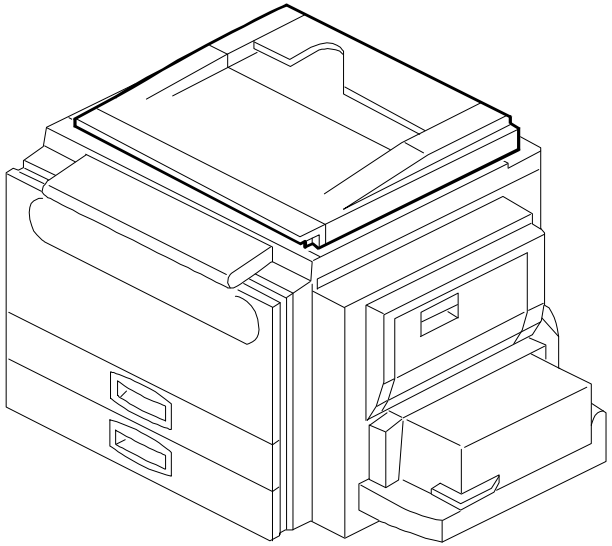
LOCATION OF UNIT

1. EXTERIOR (A133)



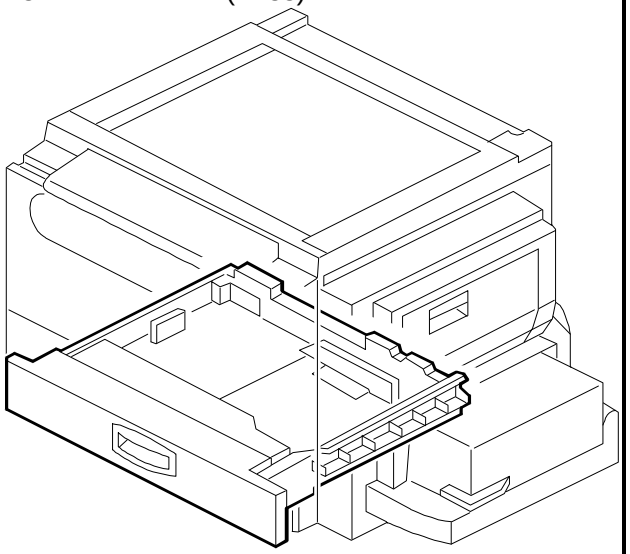
See Page 10

2. PLATENCOVER (A133)



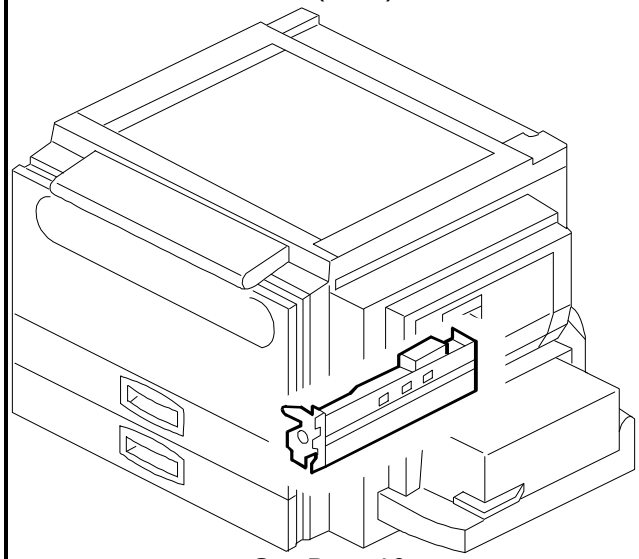
See Page 12

3. PAPER TRAY (A133)



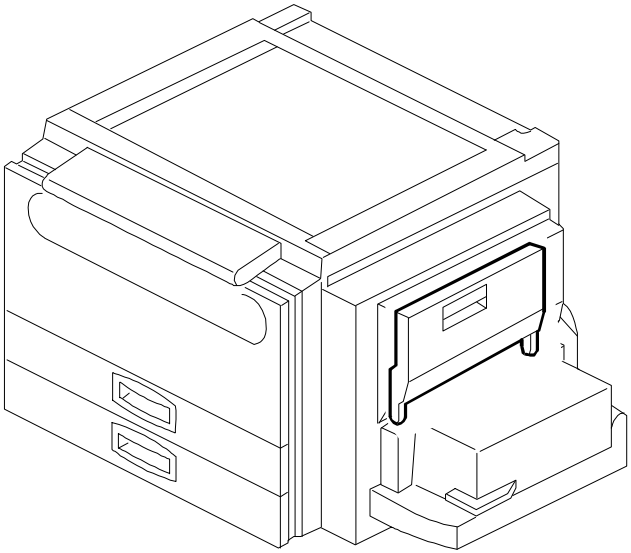
See Page 14

4. TRAY PAPER FEED (A133)



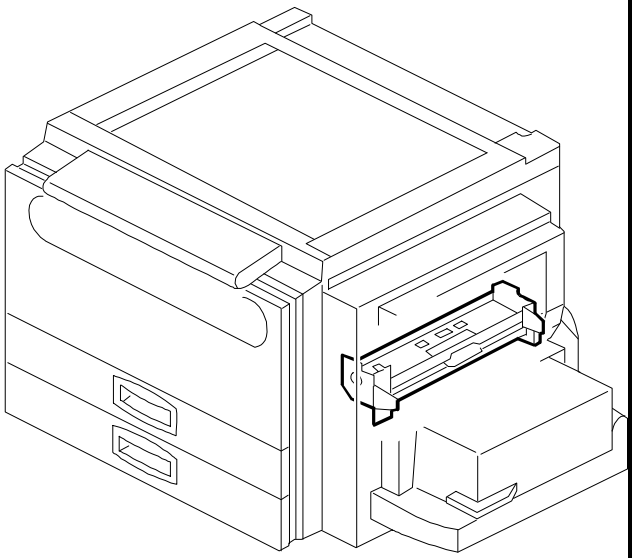
See Page 16

5. BY-PASS FEED UNIT 1 (A133)



See Page 18

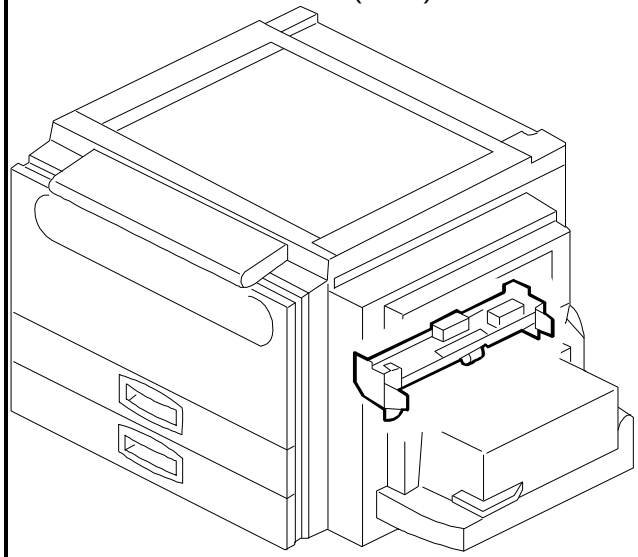
6. BY-PASS FEED UNIT 2 (A133)



See Page 20

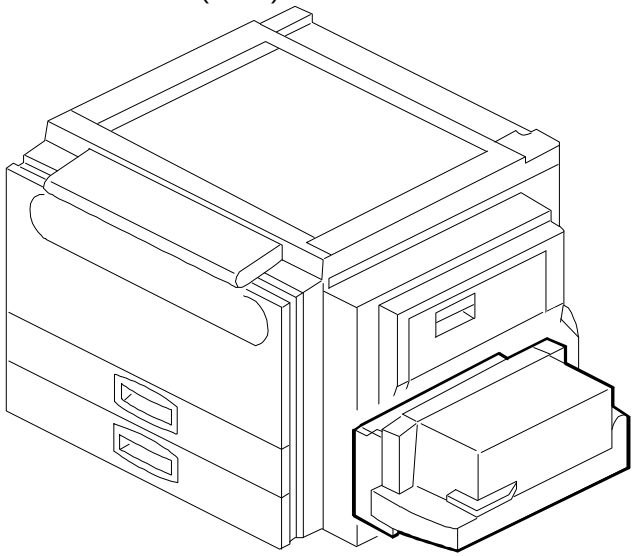
LOCATION OF UNIT

7. BY-PASS FEED UNIT 3 (A133)



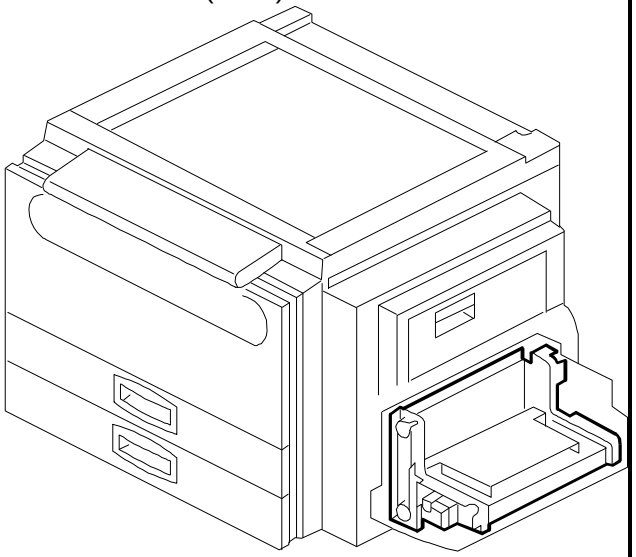
See Page 22

8. LCT UNIT 1 (A133)



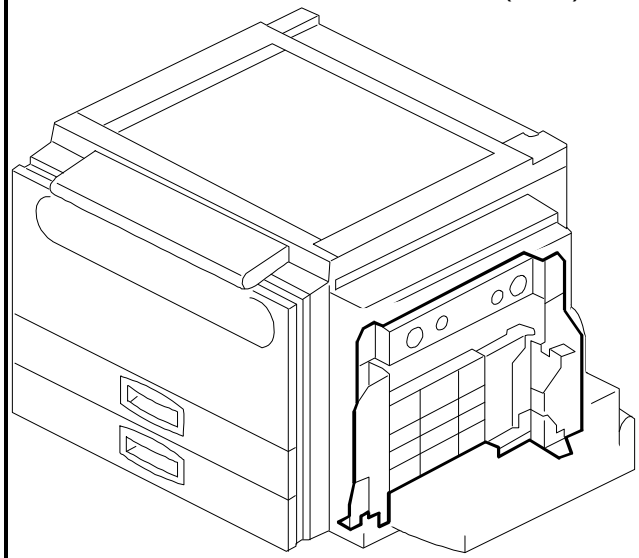
See Page 24

9. LCT UNIT 2 (A133)



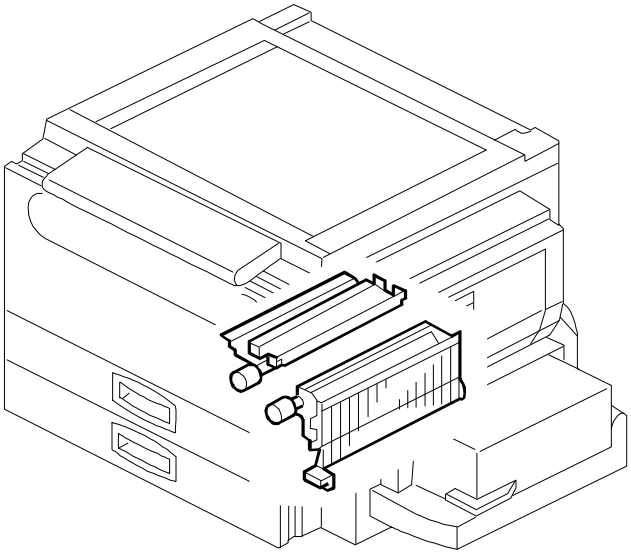
See Page 26

10. VERTICAL TRANSPORT SECTION (A133)



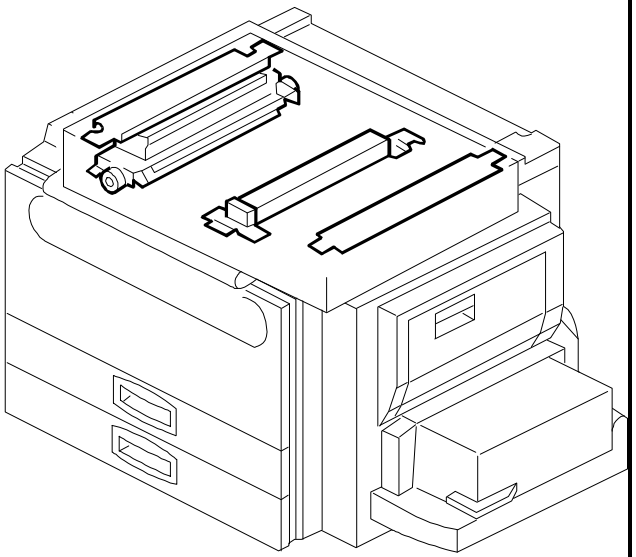
See Page 28

11. PAPER REGISTRATION (A133)



See Page 30

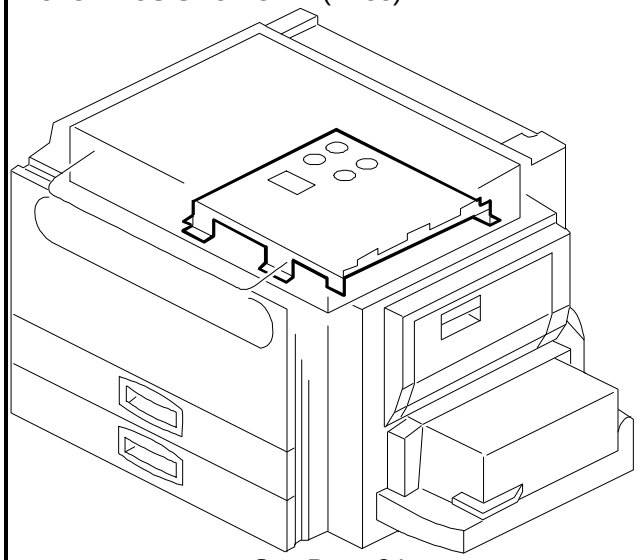
12. OPTICS SECTION 1 (A133)



See Page 32

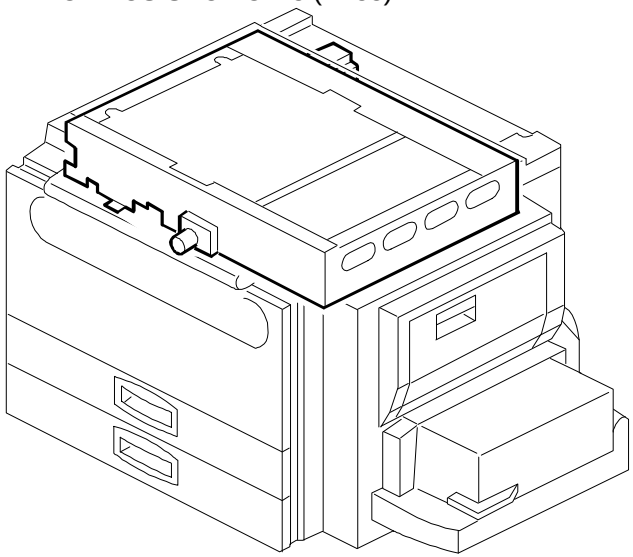
LOCATION OF UNIT

13. OPTICS SECTION 2 (A133)



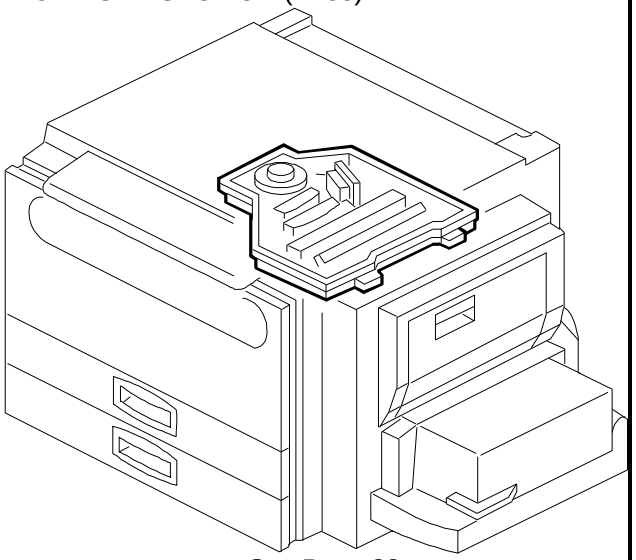
See Page 34

14. OPTICS SECTION 3 (A133)



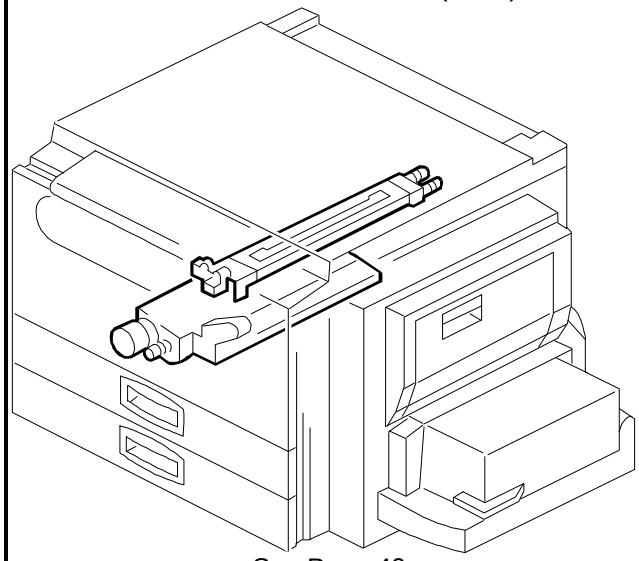
See Page 36

15. LASER SECTION (A133)



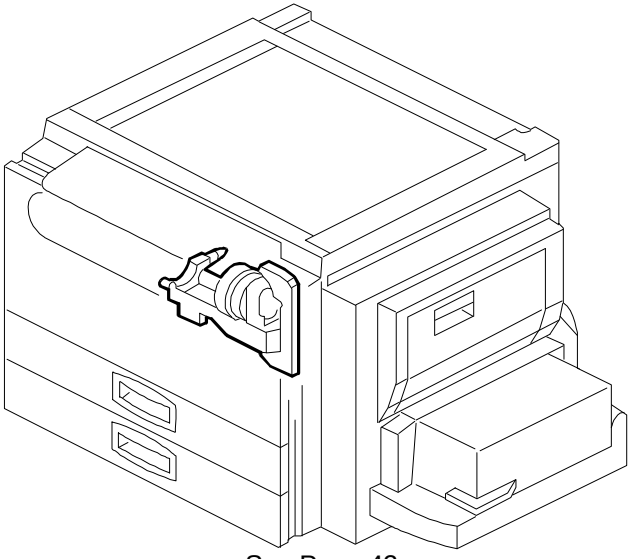
See Page 38

16. CHARGE CORONA SECTION (A133)



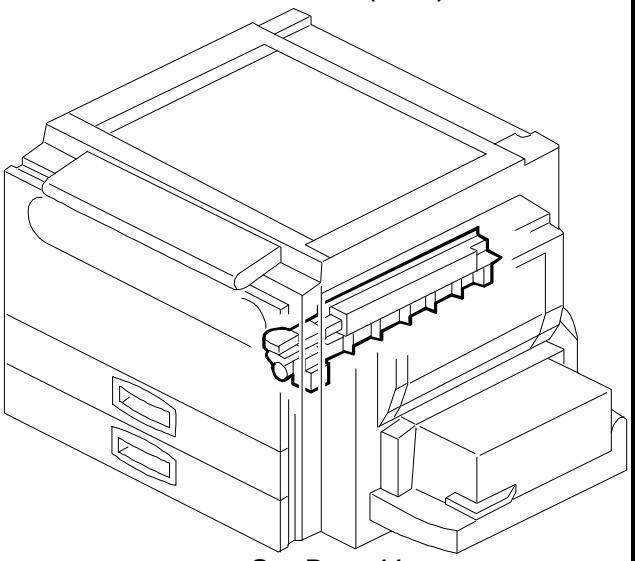
See Page 40

17. TONNER BOTTLE SECTION (A133)



See Page 42

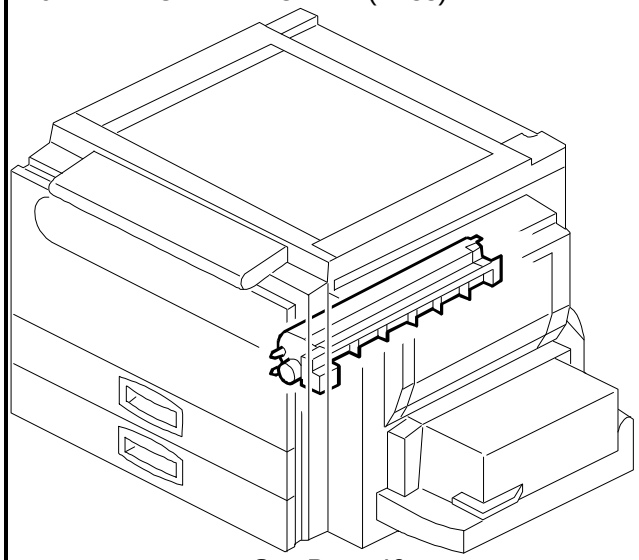
18. DEVELOPMENT UNIT 1 (A133)



See Page 44

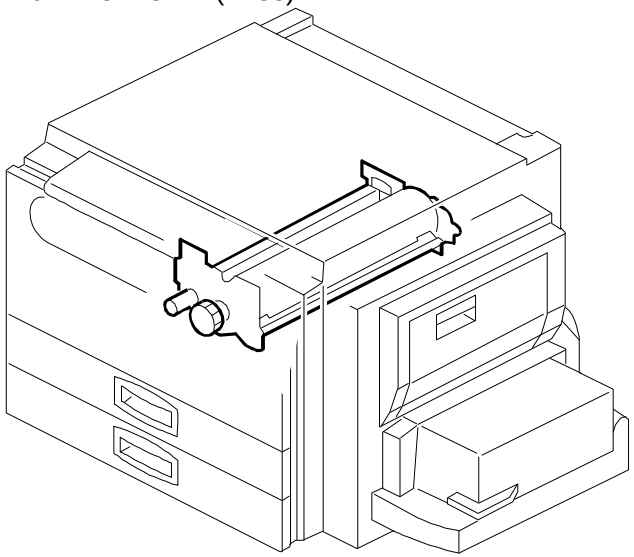
LOCATION OF UNIT

19. DEVELOPMENT UNIT 2 (A133)



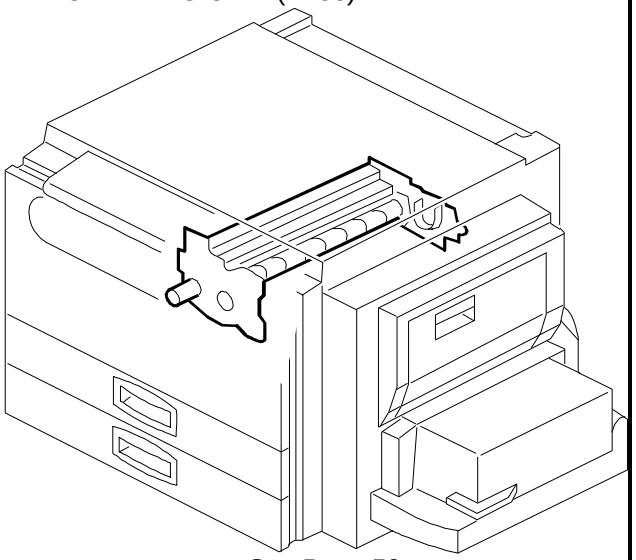
See Page 46

20. DRUM UNIT (A133)



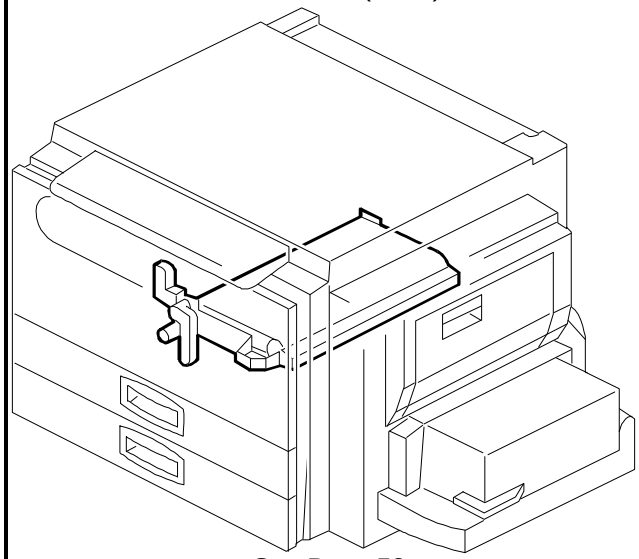
See Page 48

21. CLEANING UNIT (A133)



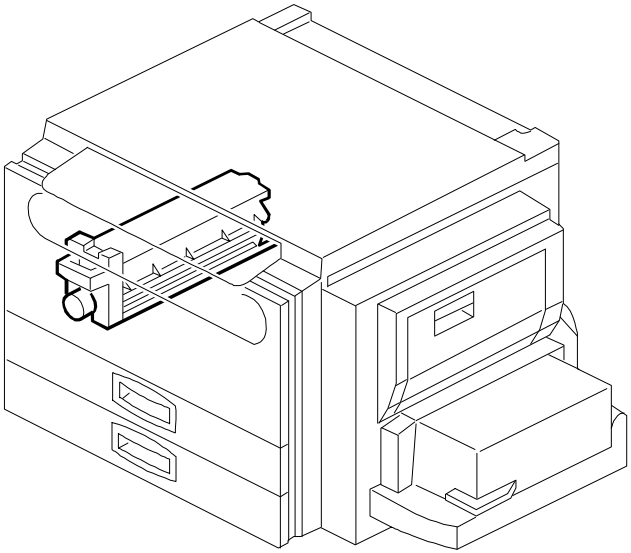
See Page 50

22. TRANSFER BELT UNIT (A133)



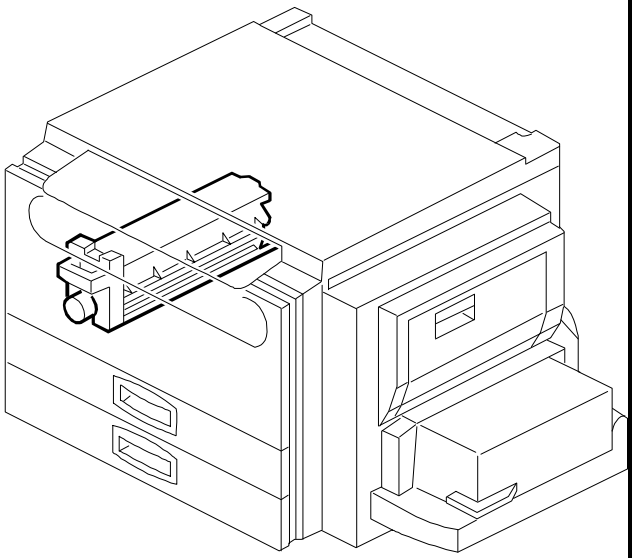
See Page 52

23. FUSING UNIT 1 (A133)



See Page 54

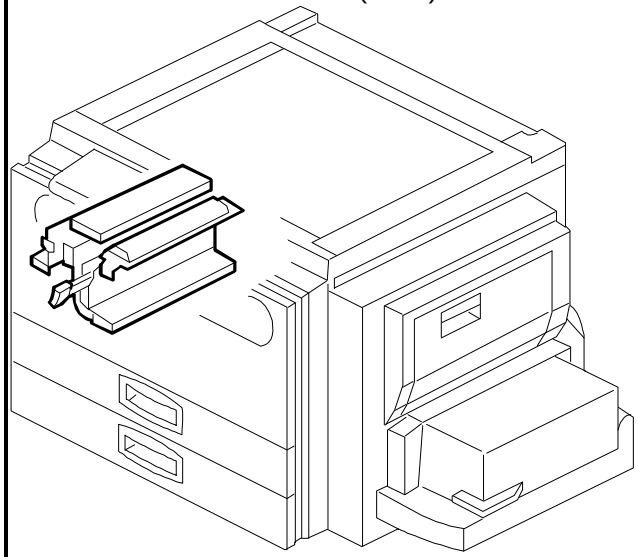
24. FUSING UNIT 2 (A133)



See Page 56

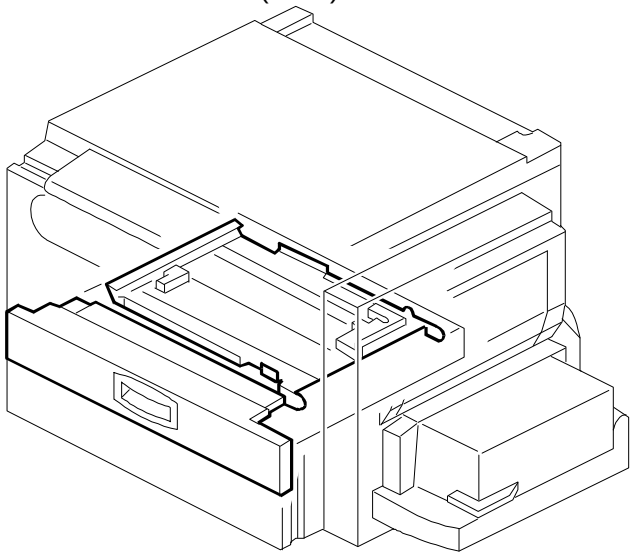
LOCATION OF UNIT

25. PAPER EXIT SECTION (A133)



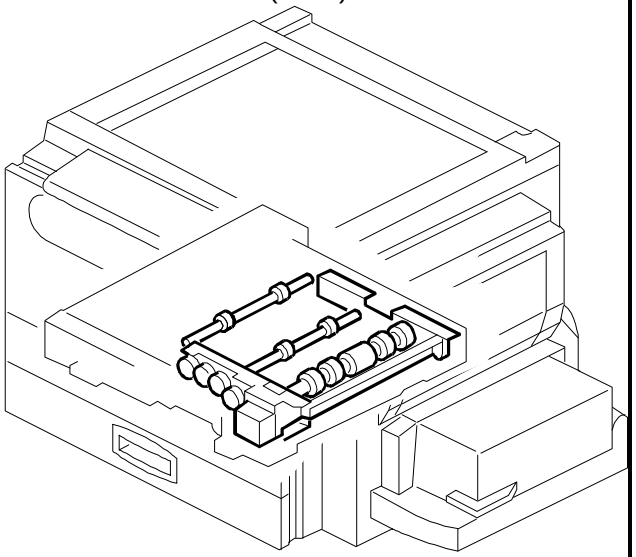
See Page 58

26. DUPLEX UNIT 1 (A133)



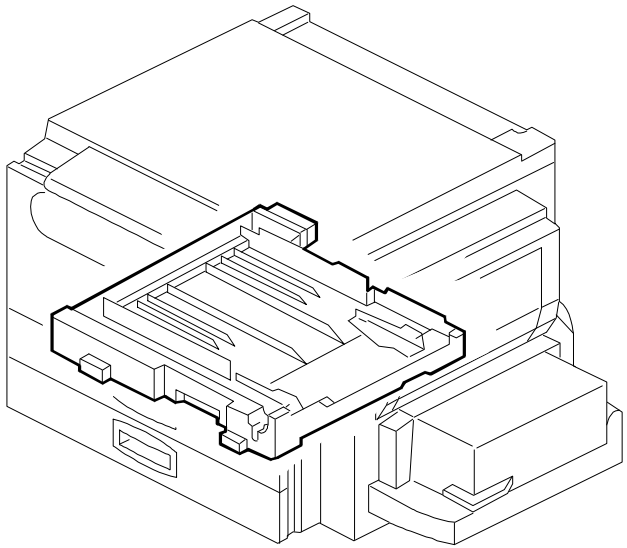
See Page 60

27. DUPLEX UNIT 2 (A133)



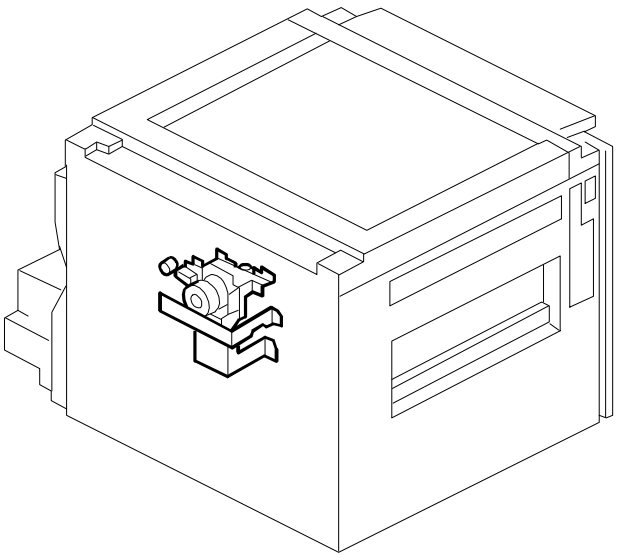
See Page 62

28. DUPLEX UNIT 3 (A133)



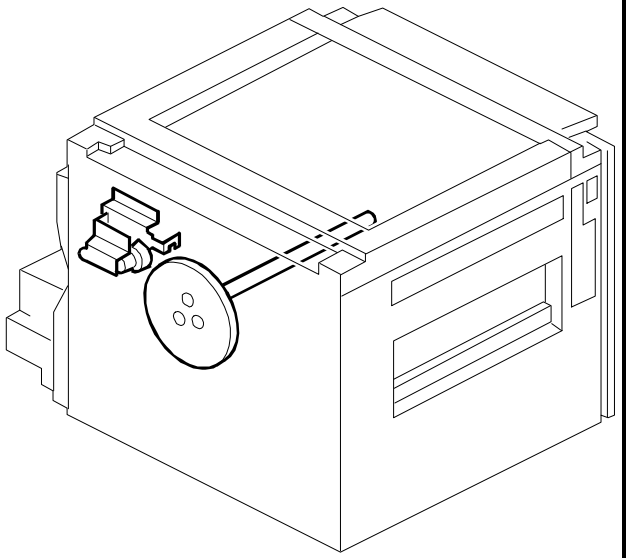
See Page 64

29. DRIVE SECTION 1 (A133)



See Page 66

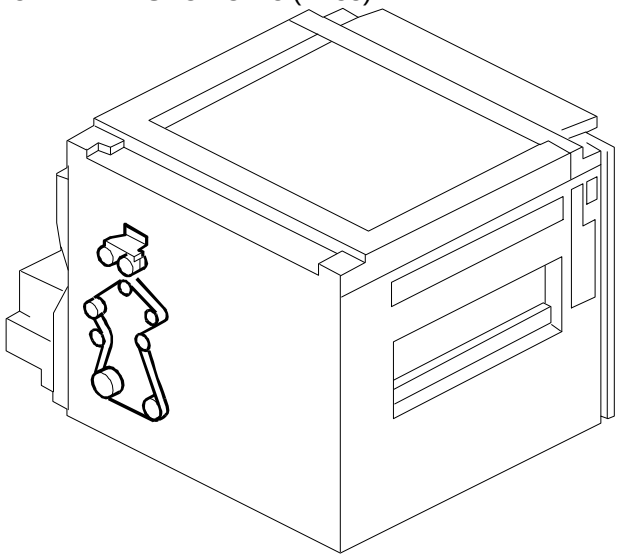
30. DRIVE SECTION 2 (A133)



See Page 68

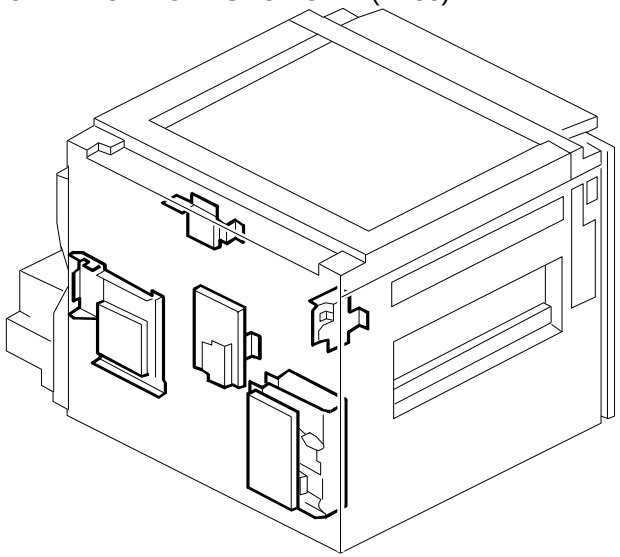
LOCATION OF UNIT

31. DRIVE SECTION 3 (A133)



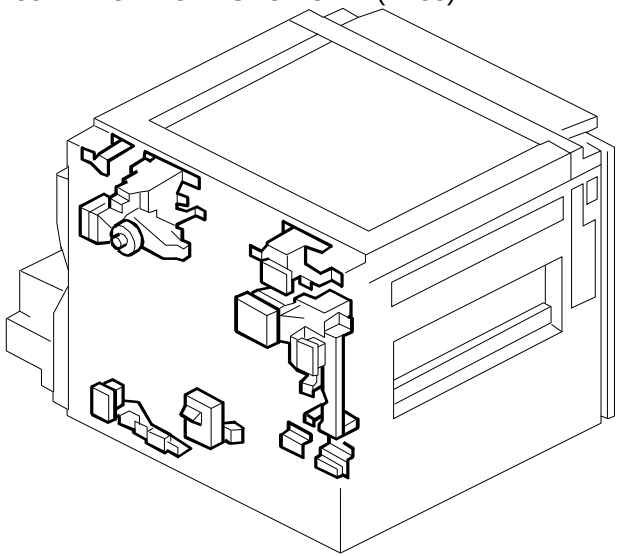
See Page 70

32. ELECTRICAL SECTION 1 (A133)



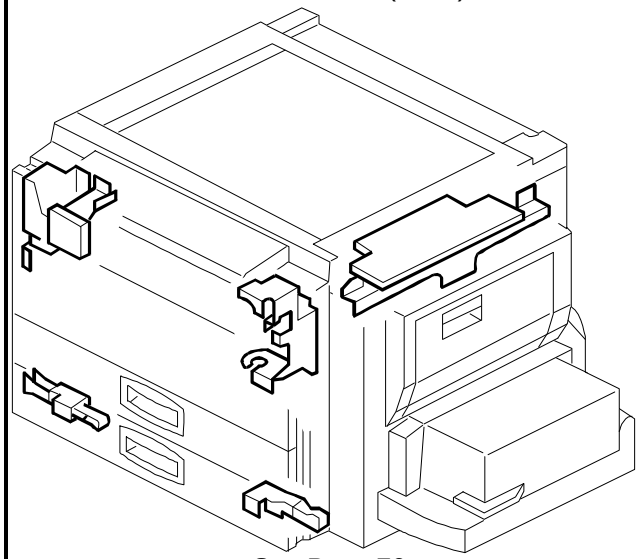
See Page 72

33. ELECTRICAL SECTION 2 (A133)



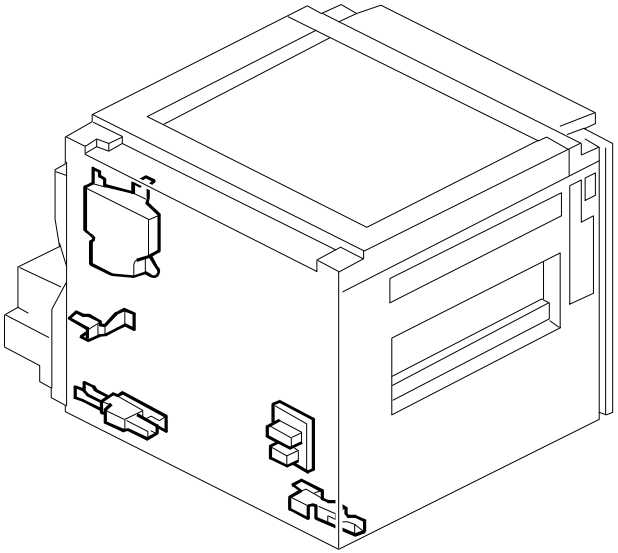
See Page 74

34. ELECTRICAL SECTION 3 (A133)



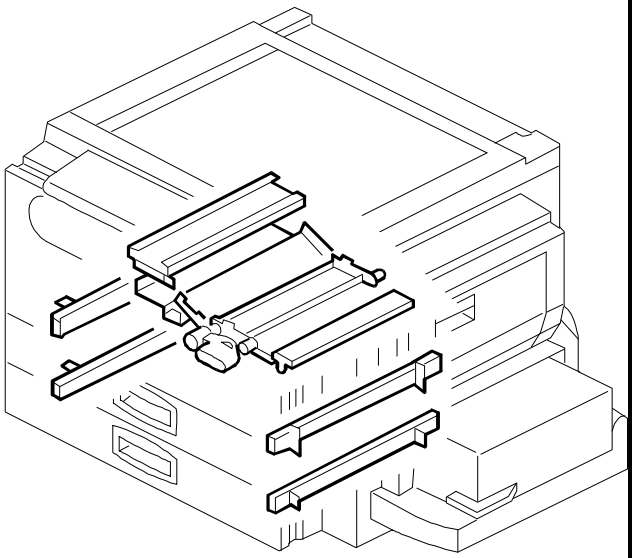
See Page 76

35. ELECTRICAL SECTION 4 (A133)



See Page 78

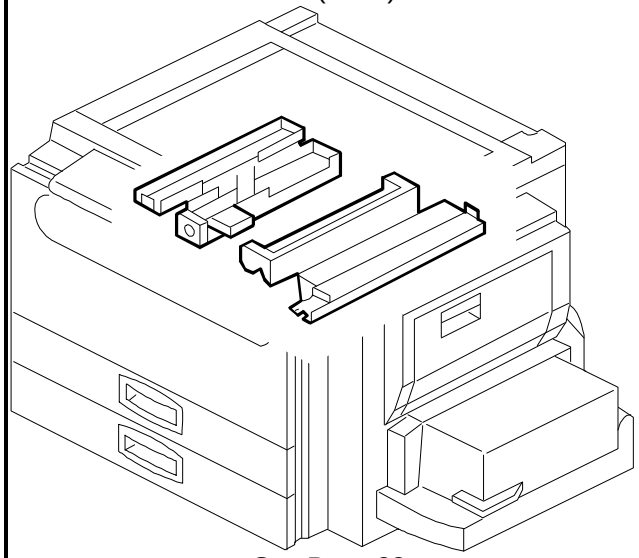
36. FRAME SECTION 1 (A133)



See Page 80

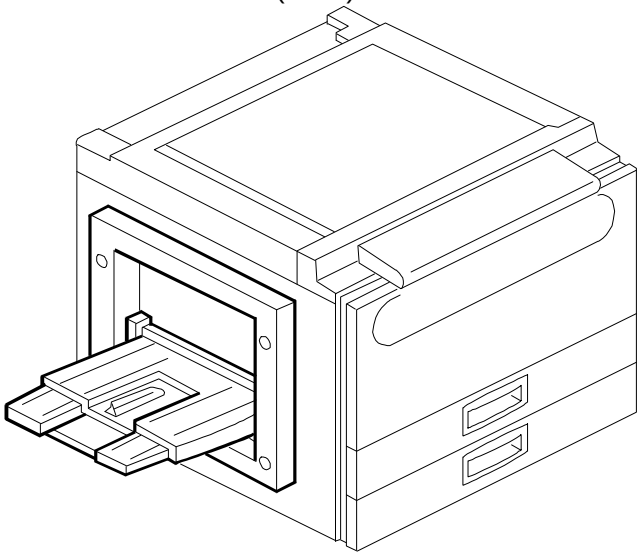
LOCATION OF UNIT

37. FRAME SECTION 2 (A133)



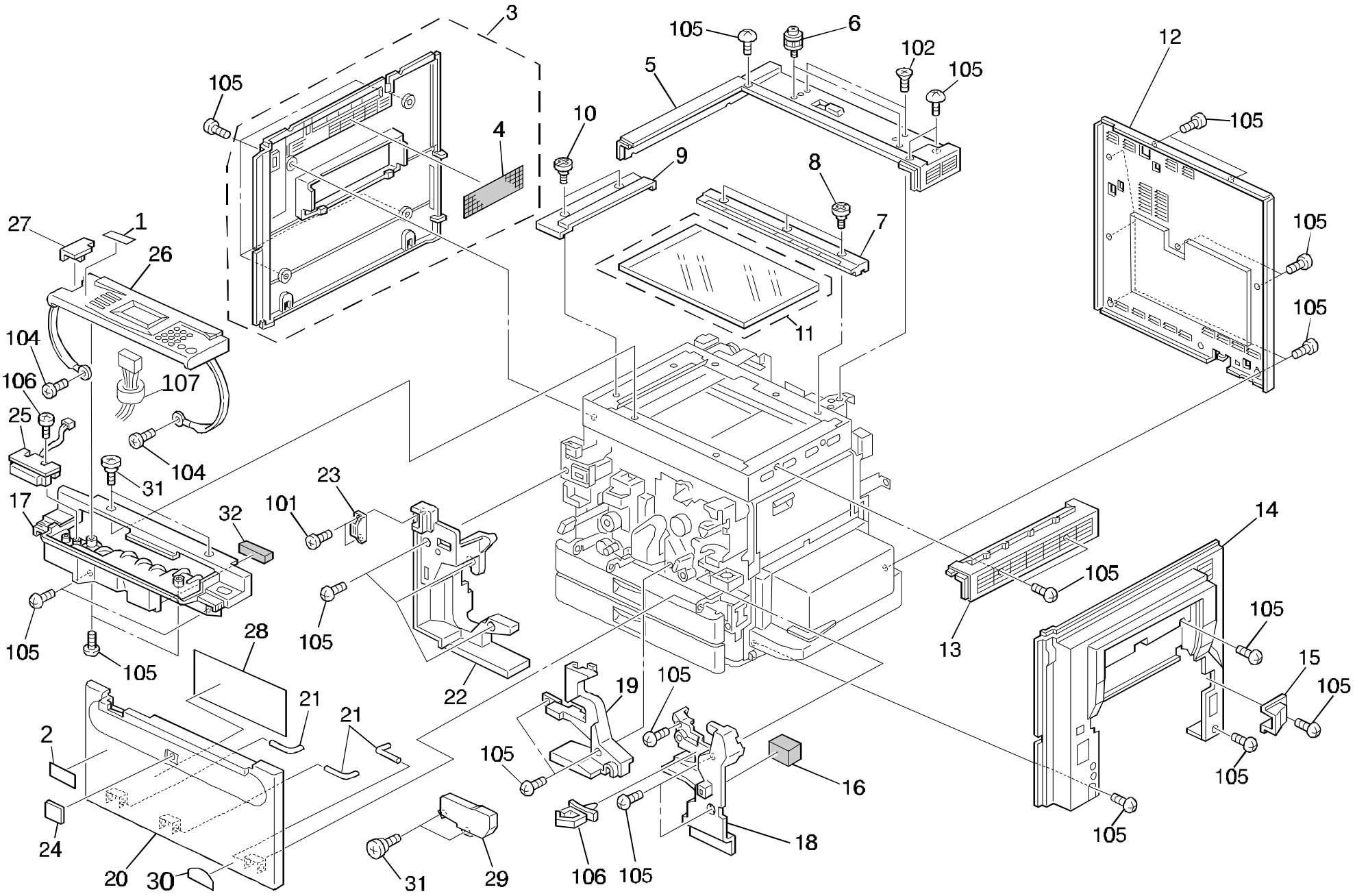
See Page 82

38. 500 COPY TRAY (A615)



See Page 84

1. EXTERIOR (A133)

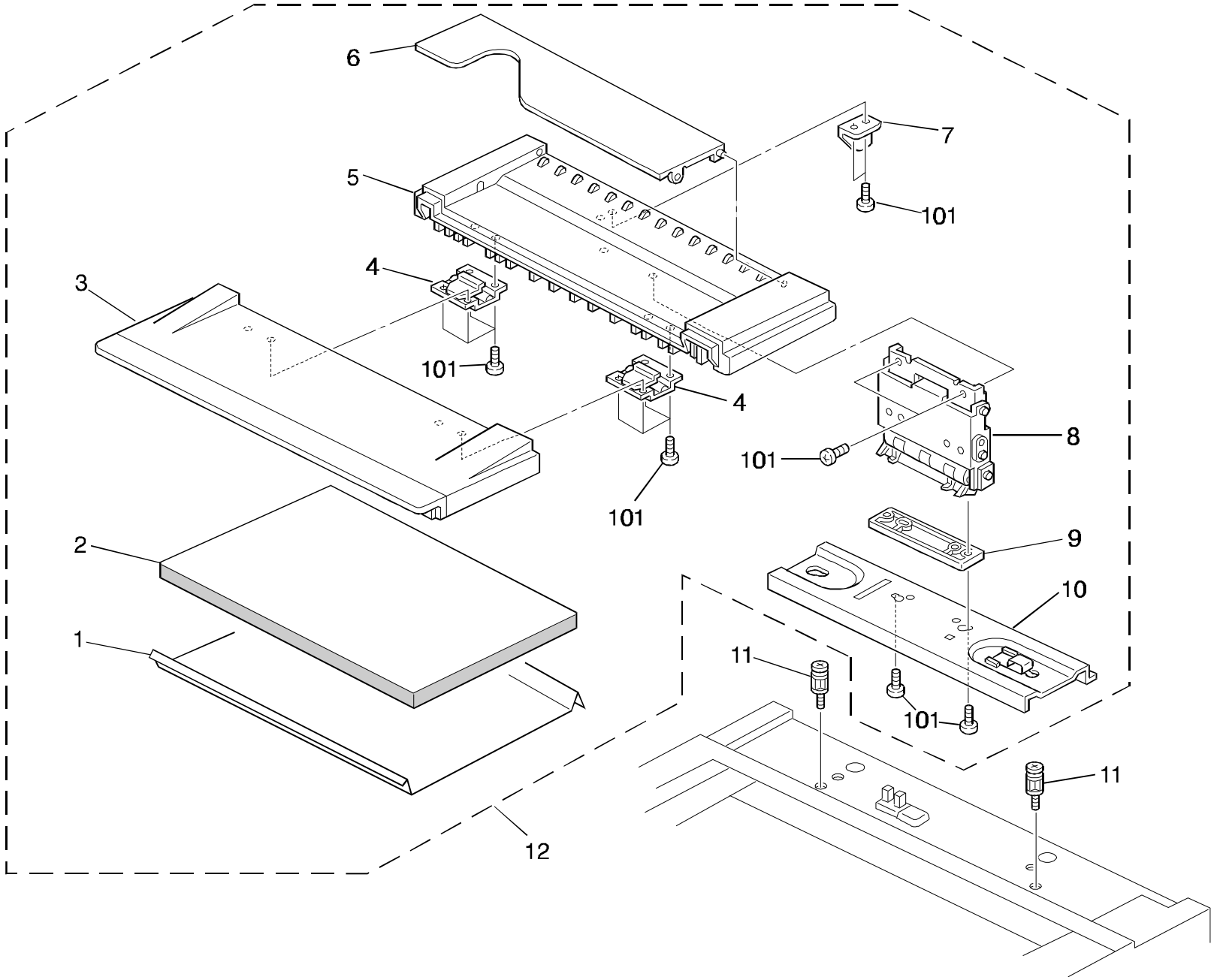


1. EXTERIOR (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A153 6409	Decal - Keytop Cover (NRG-EU)	1
2	C225 2867	Decal - Cover - Panel - Nashua	1
3	A133 7102	Left Cover	1
4	AA01 2079	Dust Filter	1
5	A134 1302	Upper Cover	1
6	AA14 8447	Guide Pin - Platen Cover	2
7	A133 7157	Rear Scale (LT)	1
7	A134 1922	Rear Scale (A4)	1
8	AA14 3219	Stepped Screw	3
9	A134 1923	Left Scale (A4)	1
9	A133 7155	Left Scale (LT)	1
10	AA14 3454	Stepped Screw - M3	2
11	A134 1924	Exposure Glass	1
12	A134 1282	Rear Cover	1
13	A134 1362	Right Upper Cover	1
14	A133 7094	Right Cover	1
15	A155 6241	LCT Harness Cover	1
16	AA15 2358	Sponge - 57x24x20	1
17	A133 7073	Front Upper Cover	1
18	A134 1352	Right Inner Cover	1
19	A134 1354	Middle Inner Cover	1
20	A133 7084	Front Cover (RIC)	1
20	A133 7106	Front Cover (NRG)	1
20	A133 7109	Front Cover (SVN)	1
20	A133 7111	Front Cover (INF)	1
21	A134 1317	Hinge - Front Cover	3
22	A134 1357	Left Inner Cover	1
23	AG07 0004	Magnetic Catch	1
24	A133 7112	Emblem (SVN)	1
24	A134 1383	Emblem (RIC)	1
24	A153 6423	Support Cover (INF)	1
25	AW01 0065	Auto Response Sensor	1
26	A133 7118	Operation Panel Ass'y (RIC/NRG LT)	1
26	A133 7119	Operation Panel Ass'y (A4)	1
26	A133 7120	Operation Panel Ass'y (SVN)	1

Index No.	Part No.	Description	Q'ty Per Assembly
27	A134 1377	Cap - Front Upper Cover	1
28	A134 1385	Misfed Removal Sheet	1
29	A130 1359	Small Inner Cover	1
30	AA00 1383	Decal - Energy Star	1
31	AA14 3718	Stepped Screw - M4	4
32	A134 1369	Seal - Front Upper Cover	1
101	0802 5085	Tapping Screw - M4x8	
102	0324 0080B	Philips Sunken Head Screw - M4x8	
103	0434 0060B	Philips Tapping Screw - M4x6	
104	0801 0150	Philips Tapping Screw W/W - M4x8	
105	0802 5094	Tapping Truss Head Screw - M4x8	
106	0802 5232	Tapping Screw - M3x8	
107	1607 0663	Ferrite Core - TFC-20-10-10 (230V)	

2. PLATENCOVER (A133)

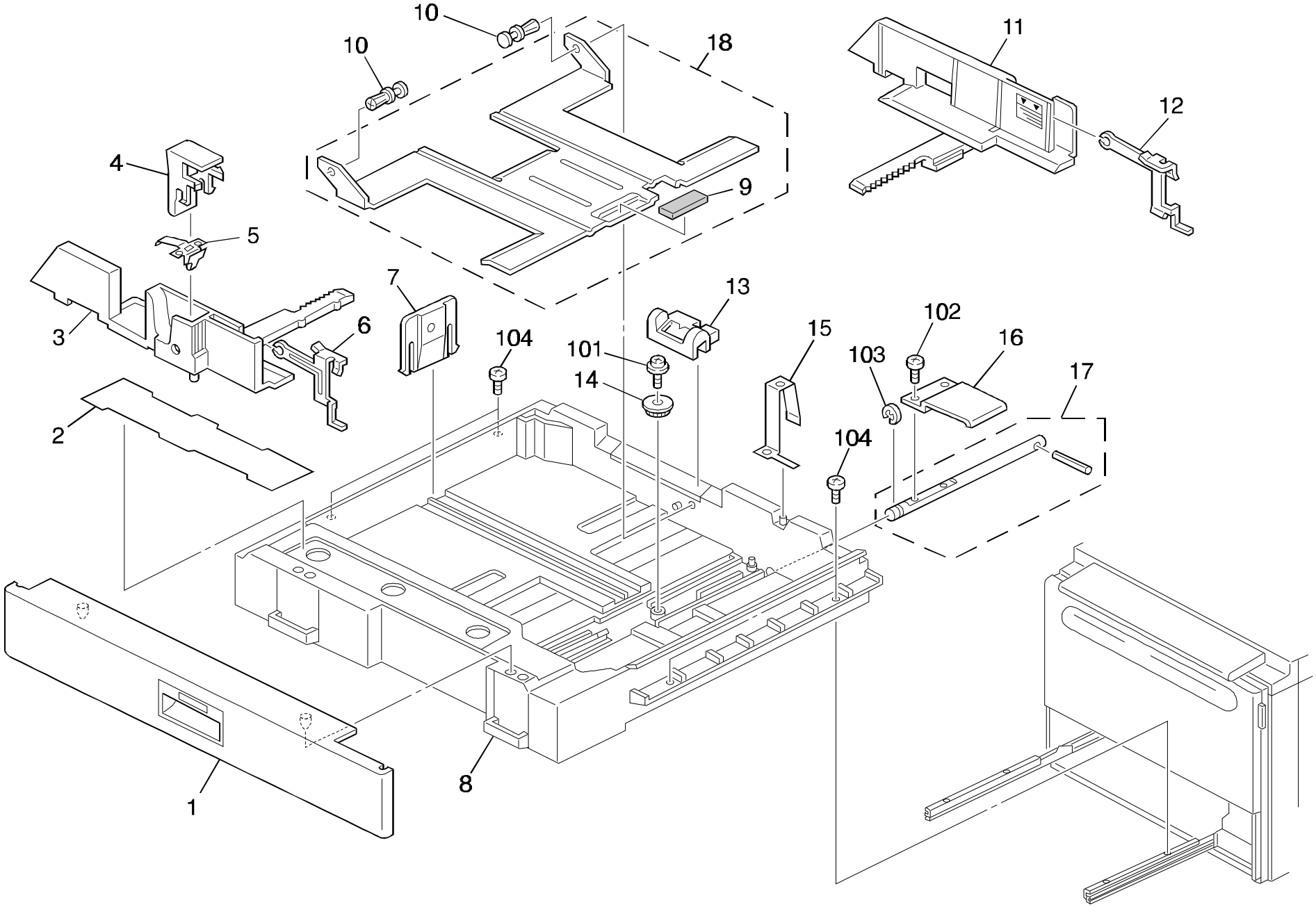


2. PLATENCOVER (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A406 9505	Platen Cover Sheet - 10 Sheet/1 Set	1
2	AA16 2053	Platen Cover Pad	1
3	A134 1394	Front Platen Cover	1
4	A053 1957	Flex Hinge - Platen Cover	2
5	A134 1395	Rear Platen Cover	1
6	A134 1396	Original Holder	1
7	A100 1324	Positioning Sensor Shutter	1
8	A100 1310	Platen Cover Hinge Ass'y	1
9	A100 1325	Hinge Spacer	1
10	A153 1380	Platen Cover Bracket	1
11	AA14 8447	Guide Pin - Platen Cover	2
12	A134 1392	Platen Cover Ass'y	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0414 0142W	Tapping Screw - M4x14	

3. PAPER TRAY (A133)

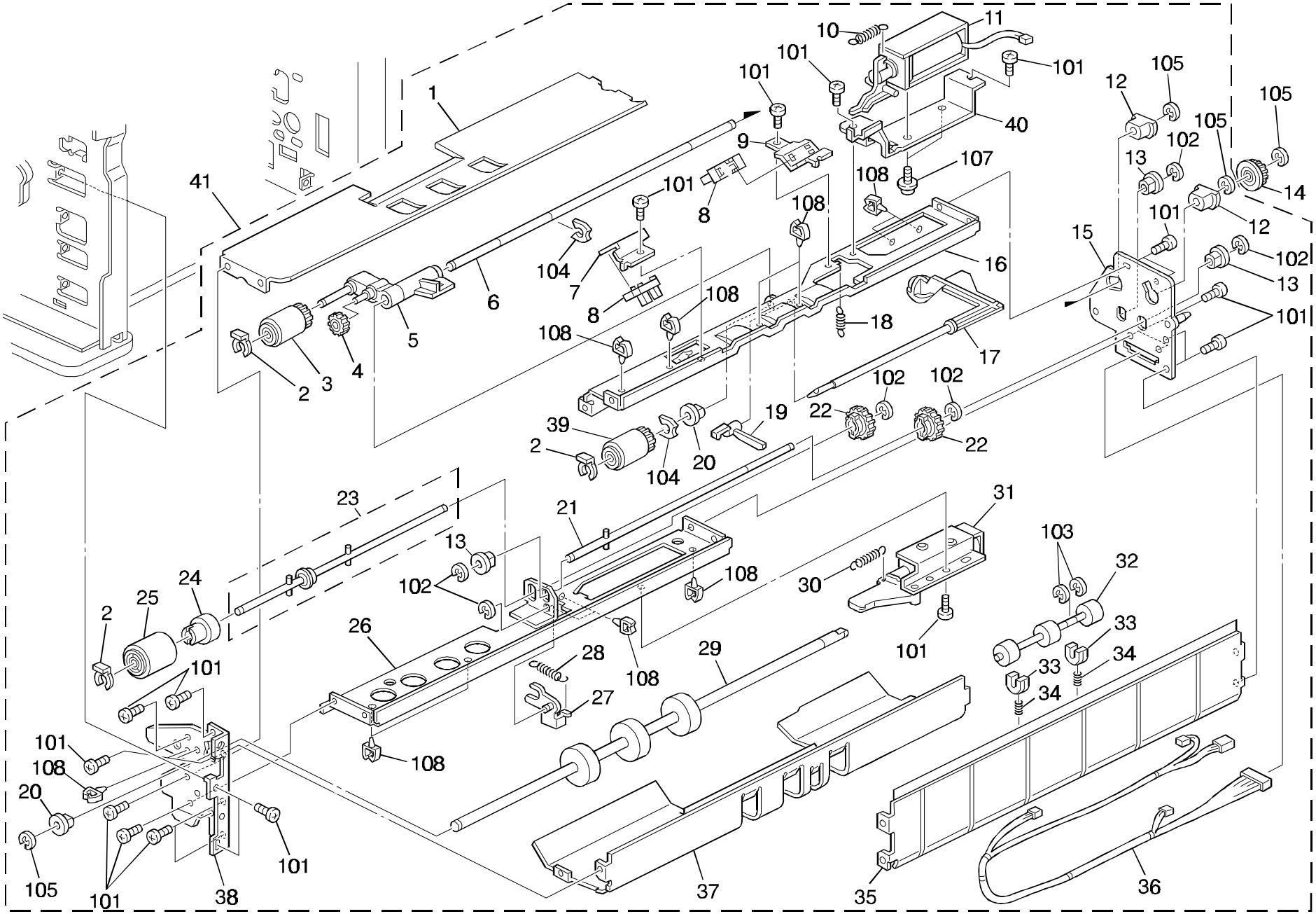


3. PAPER TRAY (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 2956	Paper Feed Front Cover	1
2	A134 2997	Decal - Paper Setting	1
3	AF01 6080	Front Side Fence	1
4	A134 2976	Stopper Lever	1
5	A134 2978	Spring Plate	1
6	A153 2991	Front Side Fence Guide	1
7	AF01 7012	End Fence	1
8	AF01 0066	Paper Tray	1
9	AF01 3014	Bottom Plate Pad	1
10	A048 2838	Nylon Rivet	2
11	AF01 6081	Rear Side Fence	1
12	A153 2992	Rear Side Fence Guide	1
13	AF01 5027	Paper Size Slider	1
14	AB01 3868	Gear - 16Z	1
15	A134 2968	Grounding Plate	1
16	A134 2967	Bottom Lift Lever	1
17	A134 2966	Bottom Lift Shaft	1
18	A134 2986	Bottom Plate	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0965 4008B	Tapping Screw - M4 X 8	
102	0434 0082B	Tapping Screw - M4x8	
103	0720 0060E	Retaining Ring - M6	
104	0344 0060F	Philips Truss Head Screw - M4x6	

4. TRAY PAPER FEED (A133)

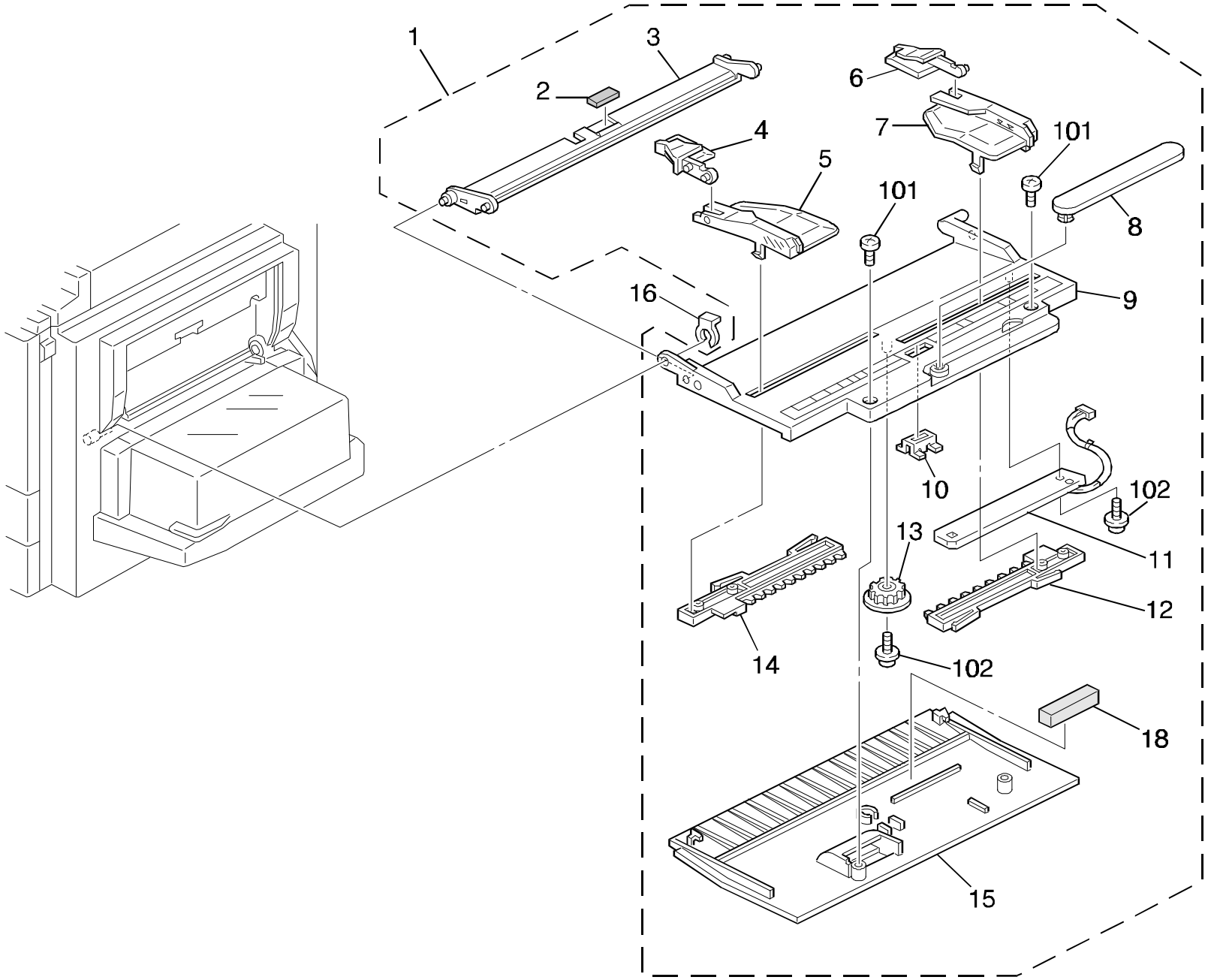


4. TRAY PAPER FEED (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 2839	Reverse Gide Plate	1
2	5447 2681	Snap Ring	3
3	AF03 0025	Pick-up Feed Roller	1
4	5447 2706	Gear - 15T	1
5	A134 2860	Pick-up Arm	1
6	AA14 0542	Feed Roller Shaft	1
7	A134 2878	Paper End Sensor Bracket	1
8	AW02 0075	Photointerrupter	2
9	A134 2873	Positioning Sensor Bracket	1
10	AA06 0577	Release Spring	1
11	A134 2866	Pick-up Solenoid	1
12	AA08 3009	Clutch Roller - 8x18x11	2
13	AA08 2046	Bushing - 6x12x6	3
14	AB03 0466	Timing Pulley - 20Z	1
15	A134 2826	Rear Side Plate	1
16	A134 2855	Lower Feed Stay	1
17	A134 2862	Paper End Sensor Feeler	1
18	AA06 0523	Pick-up Pressure Sping	1
19	A134 2863	Paper End Sensor Lever	1
20	AA08 2047	Bushing - 8x16x7	2
21	A134 2830	Drive Shaft	1
22	AB01 3420	Gear - 18Z	2
23	A134 2832	Driven Shaft Ass'y	1
24	A134 2885	Torque Limitter	1
25	AF03 2027	Separation Roller	1
26	A134 2790	Reverse Stay	1
27	A134 2795	Pressure Lever	1
28	AA06 0636	Pressure Spring	1
29	AF02 0322	Lower Drive Roller - Transport	1
30	AA06 0575	Release Spring	1
31	A134 2810	Release Solenoid	1
32	AF02 0329	Relay Roller	1
33	AA08 0156	Bushing - M4	2
34	AA06 3487	Spring - 10mm	2
35	A134 2834	Vertical Transport Guide	1

Index No.	Part No.	Description	Q'ty Per Assembly
36	A134 5315	Relay Harness - Lower Paper Feed	1
37	A134 2846	Lower Guide Plate	1
38	A134 2821	Front Side Plate	1
39	AF03 1026	Paper Feed Roller	1
40	A134 2868	Solenoid Bracket	1
101	0434 0060B	Philips Tapping Screw - M4x6	
102	0720 0040E	Retaining Ring - M4	
103	0720 0030E	Retaining Ring - M3	
104	0805 0088	Retaining Ring - M6	
105	0720 0060E	Retaining Ring - M6	
106	0742 3808	Ball Bearing - 8x16x5	
107	0960 3004B	Screw - M3x4	
108	1105 0199	Clamp	

5. BY-PASS FEED UNIT 1 (A133)

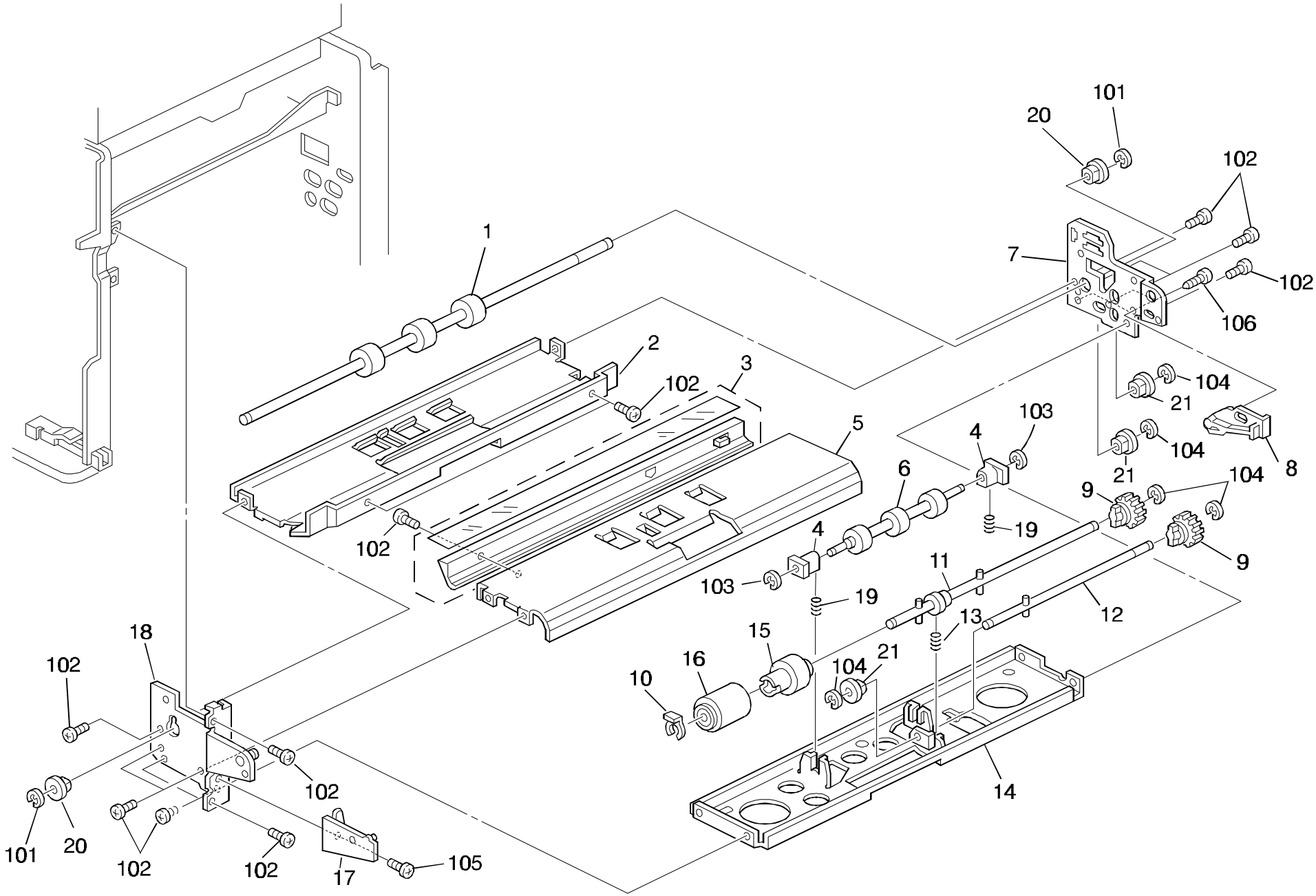


5. BY-PASS FEED UNIT 1 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A133 7309	By-pass Feed Table Ass'y	1
2	5447 2927	Friction Pad - B	1
3	A134 2741	By-pass Feed Entrance Guide	1
4	A134 2721	Front Paper Guide	1
5	A134 2711	Front Side Fence	1
6	A134 2726	Rear Paper Guide	1
7	A134 2716	Rear Side Fence	1
8	A134 2701	By-pass Feed Guide	1
9	A133 7347	By-pass Feed Table	1
10	A134 2705	Magnet Catch Plate	1
11	A134 5282	Paper Size Sensor Board	1
12	A134 2706	Rear Fence Rack	1
13	G011 3305	Gear - 16T	1
14	A134 2707	Front Fence Rack	1
15	A134 2746	By-pass Feed Cover	1
16	5215 2621	Snap Ring - M6	1
17	AA15 1998	Cushion - 10x30x5	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0965 3006B	Tapping Screw With Flat Washer M3x6	
102	0434 0060B	Philips Tapping Screw - M4x6	

6. BY-PASS FEED UNIT 2 (A133)

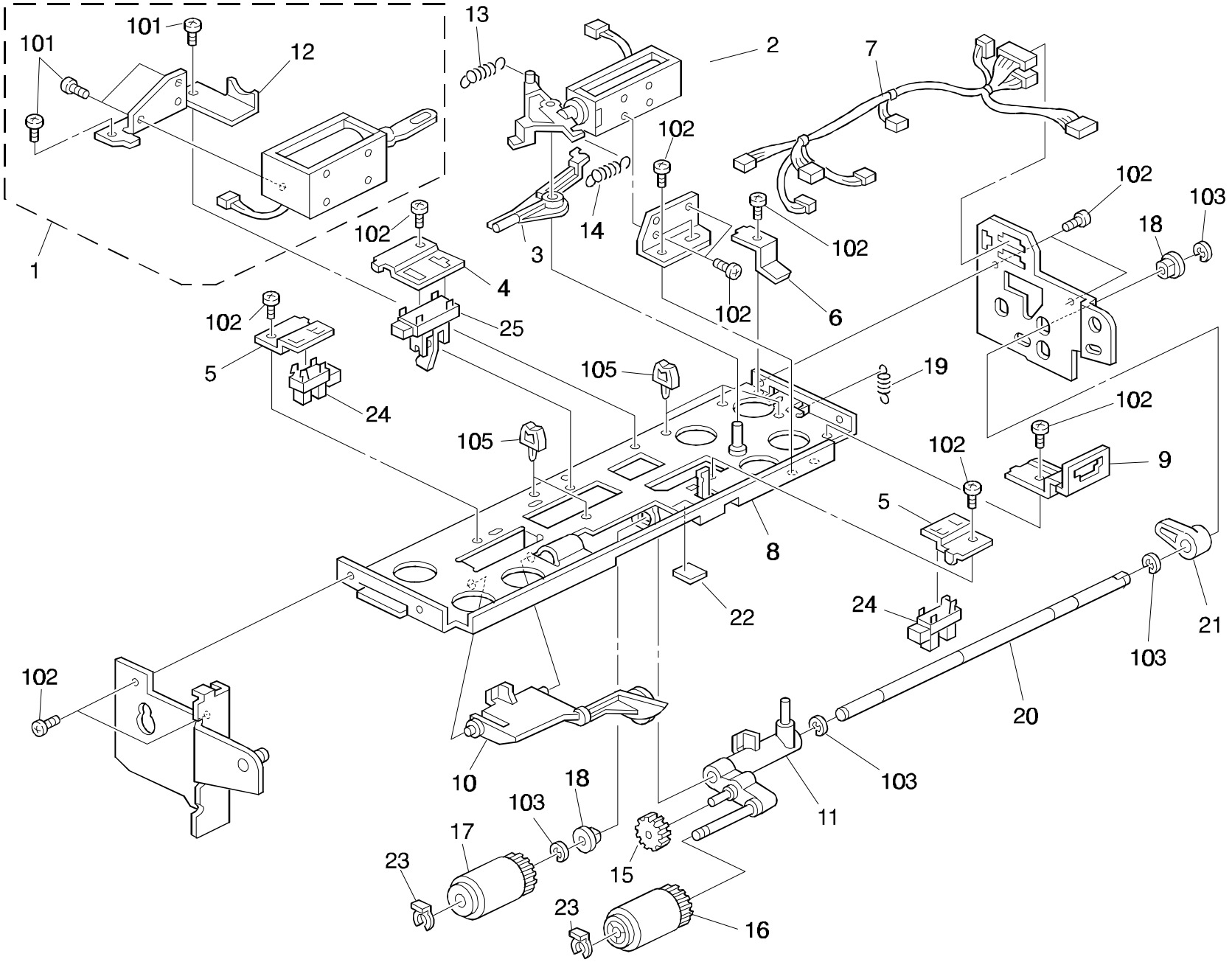


6. BY-PASS FEED UNIT 2 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AF02 0365	Transport Roller	1
2	A133 7329	Guide Plate - Paper Feed	1
3	A134 2671	Left Guide Plate - By-pass Feed	1
4	AA08 0034	Bushing - 4x5x7	2
5	A133 7318	Guide Plate - Separator	1
6	AF02 0364	Driven Roller	1
7	A133 7312	Rear Plate - By-pass Feed	1
8	A133 7343	Rear Side Fence - By-pass	1
9	AB01 3420	Gear - 18Z	2
10	5447 2681	Snap Ring	1
11	A133 7320	Drive Shaft - Feed Roller	1
12	A133 7321	Shaft - Separation	1
13	AA06 3246	Pressure Spring	1
14	A133 7314	Stay - By-pass Feed	1
15	A097 6000	Separation Torque Limitter	1
16	AF03 2031	Separation Roller	1
17	A133 7341	Front Side Fence - By-pass	1
18	A133 7310	Front Plate - By-pass Feed	1
19	AA06 3487	Spring - 10mm	2
20	AA08 2047	Bushing - 8x16x7	2
21	AA08 2046	Bushing - 6x12x6	3

Index No.	Part No.	Description	Q'ty Per Assembly
101	0720 0060E	Retaining Ring - M6	
102	0434 0060B	Philips Tapping Screw - M4x6	
103	0720 0030E	Retaining Ring - M3	
104	0720 0040E	Retaining Ring - M4	
105	0414 0080B	Binding Self-tapping Screw - M4x8	
106	0802 5236	Tapping Screw - M4x8	

7. BY-PASS FEED UNIT 3 (A133)

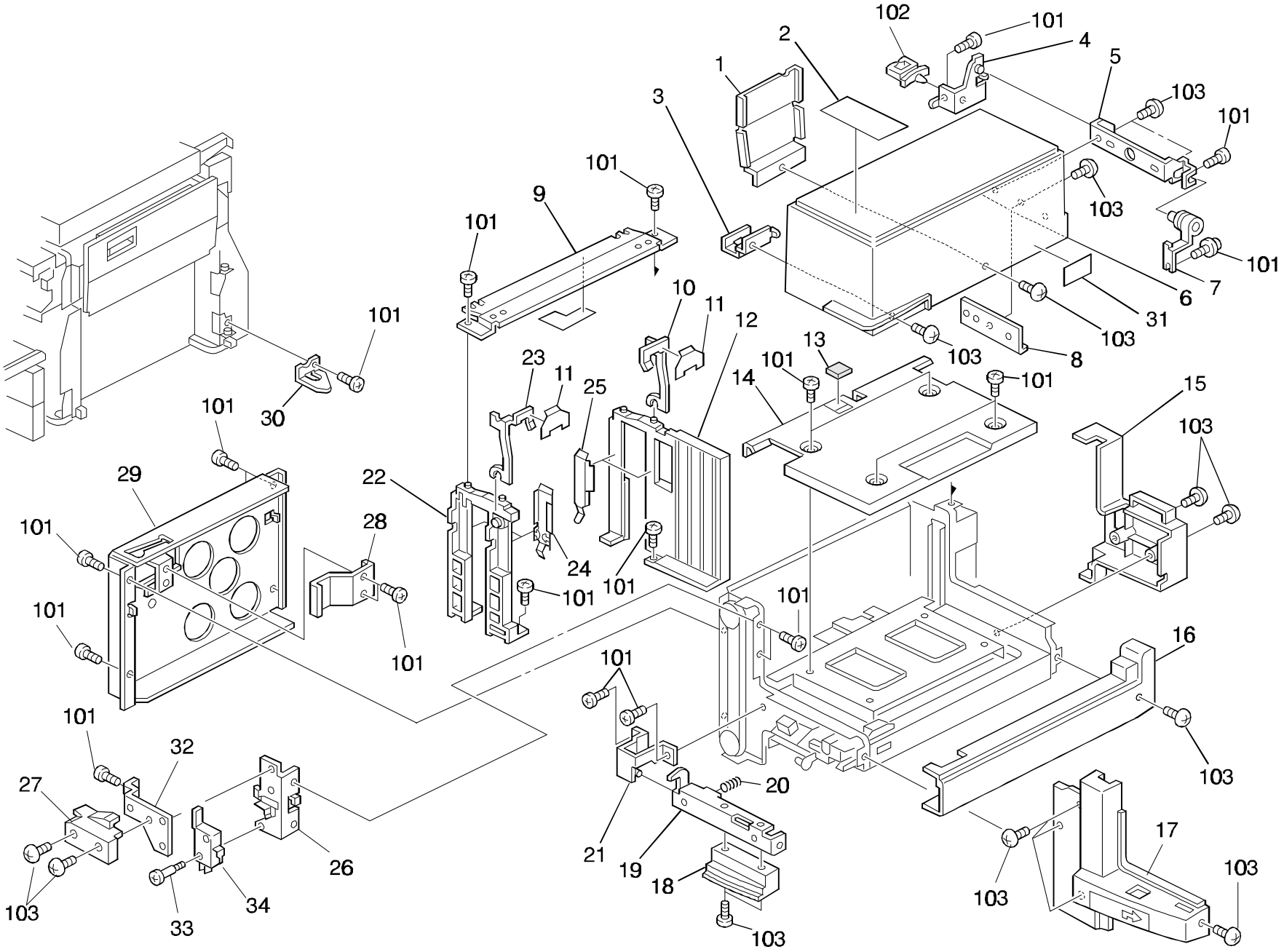


7. BY-PASS FEED UNIT 3 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A133 7336	By-pass Feed Solenoid	1
2	A133 7333	Paper Feed Solenoid - LCT	1
3	A133 7332	Pressure Lever - Pick-up	1
4	A133 7344	Bracket - Relay Sensor	1
5	A133 7345	Sensor Bracket	1
6	A133 7339	Stopper	1
7	A133 7738	Harness - By-pass Feed	1
8	A133 7325	Paper Feed Stay	1
9	A133 7331	Harness Bracket	1
10	A133 7328	Paper End Actuator	1
11	A133 7323	Arm - Pick-up	1
12	A133 7337	Solenoid Bracket	1
13	AA06 0638	Pressure Spring	1
14	AA06 0639	Pressure Spring	1
15	5447 2706	Gear - 15T	1
16	AF03 0031	Pick-up Roller	1
17	AF03 1031	Feed Roller	1
18	AA08 2047	Bushing - 8x16x7	2
19	5921 3104	Spring - Toner End Lever	1
20	AA14 0597	Shaft - Paper Feed	1
21	A096 6353	Feed Roller Lever	1
22	A469 2123	Rubber Cushion - 1x10x10mm	1
23	5447 2681	Snap Ring	2
24	AW02 0075	Photointerrupter	2
25	AW02 0085	Photointerrupter	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0313 0040B	Philips Pan Head Screw - M3x4	
102	0434 0060B	Philips Tapping Screw - M4x6	
103	0720 0060E	Retaining Ring - M6	
104	1105 0229	Clamp	
105	1105 0199	Clamp	

8. LCT UNIT 1 (A133)

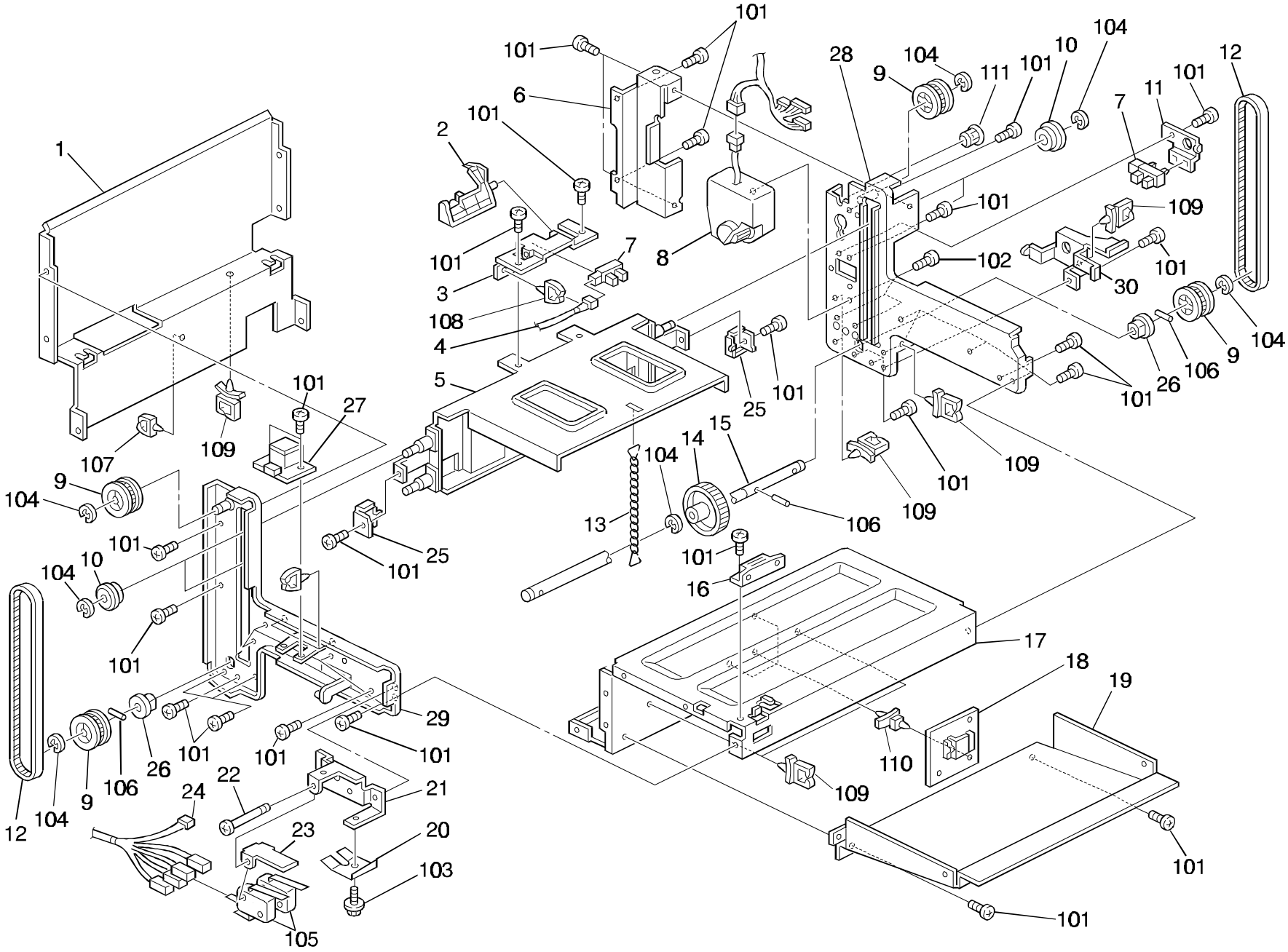


8. LCT UNIT 1 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A133 7377	End Fence	1
2	A155 6113	Decal - Paper Set	1
3	A155 6207	Cover Bracket	1
4	A335 3251	Top Cover Hinge	1
5	A155 6302	Hinge Angle	1
6	A155 6101	LCT Upper Cover	1
7	A335 3251	Top Cover Hinge	1
8	A133 7392	Hinge Bracket	1
9	A133 7376	Upper Stay	1
10	A155 6312	Rear Paper Holder	1
11	A155 6313	Support Guide	2
12	A155 6307	Rear Side Fence	1
13	A421 2543	Friction Pad	1
14	A155 6142	LCT Paper Tray	1
15	A155 6221	LCT Rear Cover	1
16	A155 6231	LCT Right Cover	1
17	A133 7371	LCT Front Cover	1
18	A155 6181	Knob	1
19	A155 6171	Grip Bracket	1
20	AA06 3239	Spring - Handle	1
21	A155 6170	Hinge Bracket	1
22	A155 6306	Front Side Fence	1
23	A155 6311	Front Paper Holder	1
24	A155 6321	Front Spring Plate	1
25	A155 6322	Rear Sprig Plate	1
26	A133 7361	Bracket - Positioning Plate	1
27	A133 7364	Rail - LCT	1
28	A133 7358	Pressure Spring Plate	1
29	A133 7355	LCT Motor Cover	1
30	A155 6169	Hinge Holder	1
31	A155 6114	Dautions Decal - LCT	1
32	A133 7360	Positioning Plate - LCT	1
33	AA14 3461	Stepped Screw - M2.5	1
34	A133 7369	Micro Switch	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0434 0060B	Philips Tapping Screw - M4x6	
102	1105 0197	Wire Saddle	
103	0802 5094	Tapping Truss Head Screw - M4x8	

9. LCT UNIT 2 (A133)

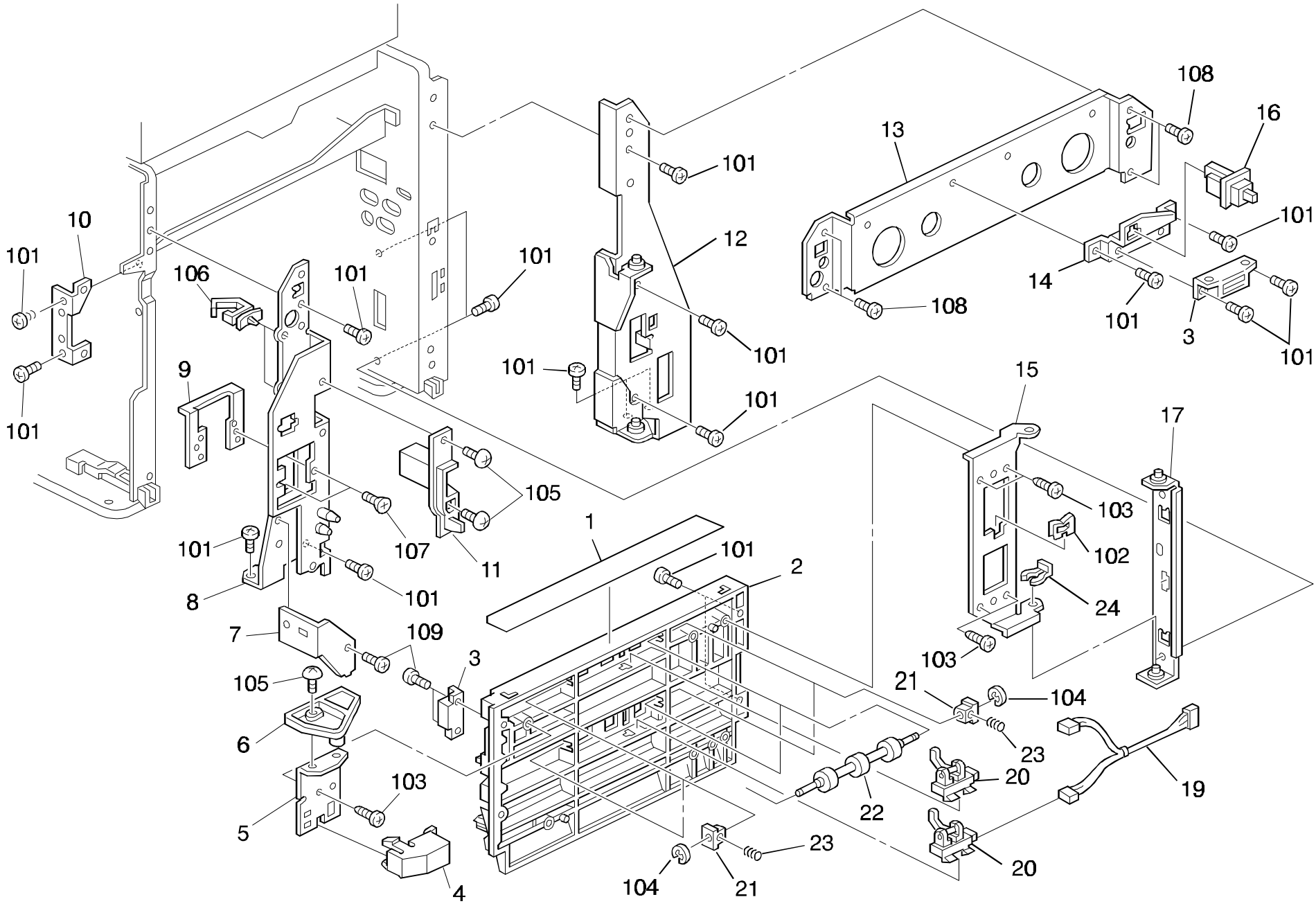


9. LCT UNIT 2 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A155 6143	Left Bracket	1
2	A155 6148	Paper End Sensor Feeler	1
3	A155 6147	Paper End Sensor Bracket	1
4	A155 5348	Paper End Sensor Harness	1
5	A155 6203	Paper Tray Stay	1
6	A155 6153	Upper Hinge	1
7	AW02 0075	Photointerrupter	2
8	AX05 0090	Motor - DC 24V 36W	1
9	AB03 0281	Timing Pulley - 28Z	4
10	A335 4351	Guide Roller	4
11	A155 6136	Lift Sensor Bracket	1
12	AA04 3456	Timing Belt - S3M167	2
13	5925 2258	Stopper Chain	1
14	AB01 1133	Gear - 49Z	1
15	AA14 0576	LCT Drive Shaft	1
16	AG07 0004	Magnetic Catch	1
17	A155 6141	Tray Bottom Plate	1
18	A155 5165	LCT Main Board	1
19	A155 6145	Tray Cover	1
20	A155 6118	Spring Plate	1
21	A155 6116	Safety Switch Bracket	1
22	A300 3155	Stepped Screw - M25x32	1
23	A155 6117	Safety Switch Lever	1
24	A133 7743	LCT Harness	1
25	A335 4352	Timing Belt Clamp	2
26	5053 0223	Bushing - 8mm	2
27	A155 5170	Push Switch	1
28	A155 6125	Rear Side Bracket	1
29	A155 6110	Front Side Plate - LCT	1
30	A155 6215	Harness Guide	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0434 0060B	Philips Tapping Screw - M4x6	
102	0802 5236	Tapping Screw - M4x8	
103	0443 0060B	Hexagon Tapping Screw - M3x6	
104	0720 0060E	Retaining Ring - M6	
105	1204 2355	Micro Switch - AM51632A531	
106	0623 0160E	Spring Pin - 3x16mm	
107	1105 0196	Harness Clamp	
108	1105 0199	Clamp	
109	1105 0197	Wire Saddle	
110	1105 0192	Locking Support	
111	1106 0193	Bushing - 7.9mm	

10. VERTICAL TRANSPORT SECTION (A133)

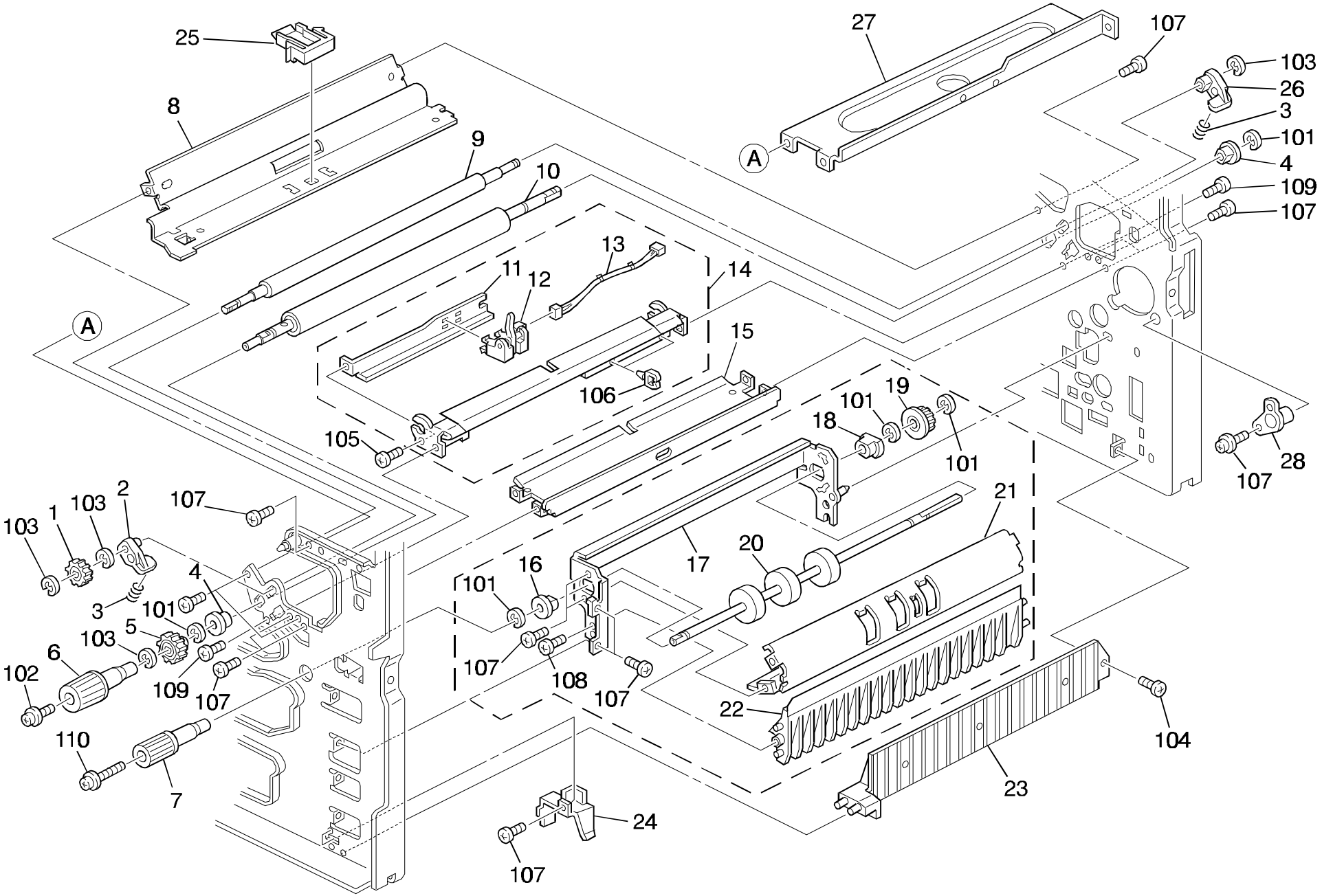


10. VERTICAL TRANSPORT SECTION (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 2588	Paper Guide	1
2	A134 2585	Vertical Transfer Guide Plate	1
3	AG07 0004	Magnetic Catch	2
4	A133 7386	Pressure Guide - Vertical Transport	1
5	A133 7385	Bracket - Vertical Transport	1
6	A133 7375	Joint - Vertical Transport	1
7	A133 7066	Bracket - Right Inner Cover	1
8	A133 7037	Front LCT Frame	1
9	5446 1239	Plate Nut - Key Counter	1
10	A133 7007	By-pass Feed Bracket	1
11	A133 7040	Rail - LCT	1
12	A133 7046	Rear LCT Frame	1
13	A133 7060	Upper LCT Frame	1
14	A133 7064	Magnet Clutch Bracket	1
15	A133 7388	Fulcrum Bracket - Vertical Trans.	1
16	AW50 0012	Push Switch	1
17	A133 7383	Hinge - Vertical Transport	1
19	A133 7739	Vertical harness	1
20	AW02 0069	Photointerruptor	2
21	AA08 0034	Bushing - 4x5x7	4
22	AF02 0330	Vertical Driven Roller	2
23	AA06 3487	Spring - 10mm	4
24	5447 2681	Snap Ring	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0434 0060B	Philips Tapping Screw - M4x6	
102	1105 0329	Clamp - ES-0510	
103	0802 5237	Binding Self-tapping Screw - M4x10	
104	0720 0030E	Retaining Ring - M3	
105	0802 5094	Tapping Truss Head Screw - M4x8	
106	1105 0310	Wire Clamp	
107	0323 0080B	Philips Sunk Screw - M3x8	
108	0414 0080B	Binding Self-tapping Screw - M4x8	

11. PAPER REGISTRATION (A133)

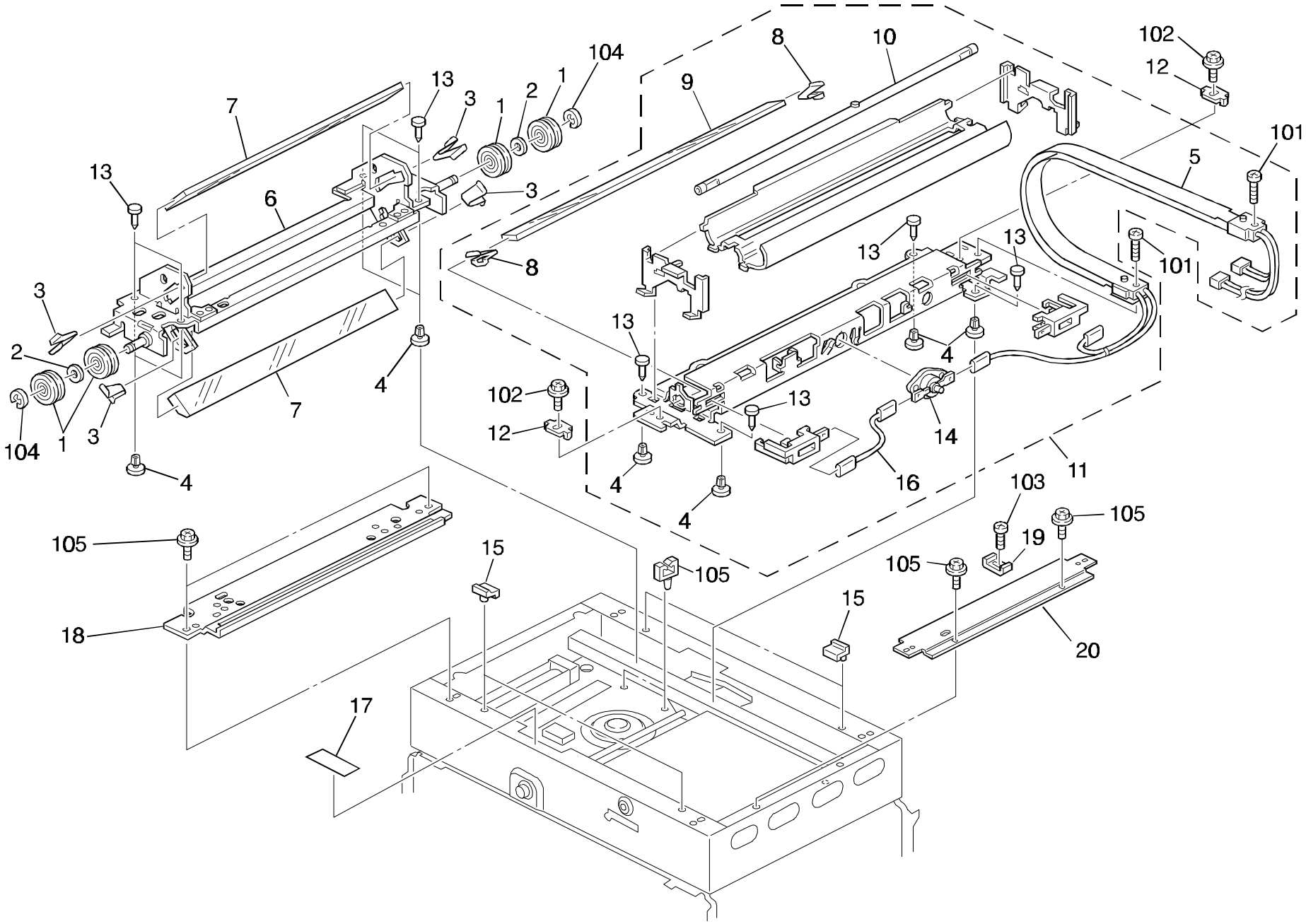


11. PAPER REGISTRATION (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AB01 3486	Gear - 14Z	1
2	AA08 0171	Bushing	1
3	AA06 3242	Registration Pressure Spring - Rear	2
4	5474 2152	Bushing - 8x12x12mm	2
5	AB01 3485	Gear - 20Z	1
6	AG05 0074	Registration Knob	1
7	AG05 0075	Middle Knob	1
8	A133 7023	Fusing Entrance Stay	1
9	AF02 1052	Upper Registration Roller	1
10	AF02 0316	Lower Registration Roller	1
11	A134 2557	Regist Sensor Bracket	1
12	AW02 0068	Photointerruptor	1
13	A134 5472	Relay Harness - Regist.Sensor	1
14	A134 2558	Upper Guide Plate - Registration	1
15	A134 2553	Lower Registration Guide	1
16	AA08 2047	Bushing - 8x16x7	1
17	A134 2900	Duplex Stay	1
18	AA08 3009	Clutch Roller - 8x18x11	1
19	AB03 0466	Timing Pulley - 20Z	1
20	AF02 0321	Paper Feed Drive Roller	1
21	A134 2903	Upper Guide Plate - Duplex Feed	1
22	A134 2904	Lower Guide Plate - Duplex Feed	1
23	A134 2895	Vertical Relay Guide	1
24	A134 2582	Sensor Bracket - Vertical Transfer	1
25	A133 7027	Registration Rolller Cleaner	1
26	AA08 0172	Bushing	1
27	A133 7226	Lower Development Stay	1
28	A133 7031	Idler Bracket	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0720 0060E	Retaining Ring - M6	
102	0951 3006B	Philips Screw With Flat Washer-M3x6	
103	0720 0040E	Retaining Ring - M4	
104	0414 0080B	Binding Self-tapping Screw - M4x8	
105	0313 0040B	Philips Pan Head Screw - M3x4	
106	1105 0199	Clamp	
107	0434 0060B	Philips Tapping Screw - M4x6	
108	0802 5237	Binding Self-tapping Screw - M4x10	

12. OPTICS SECTION 1 (A133)

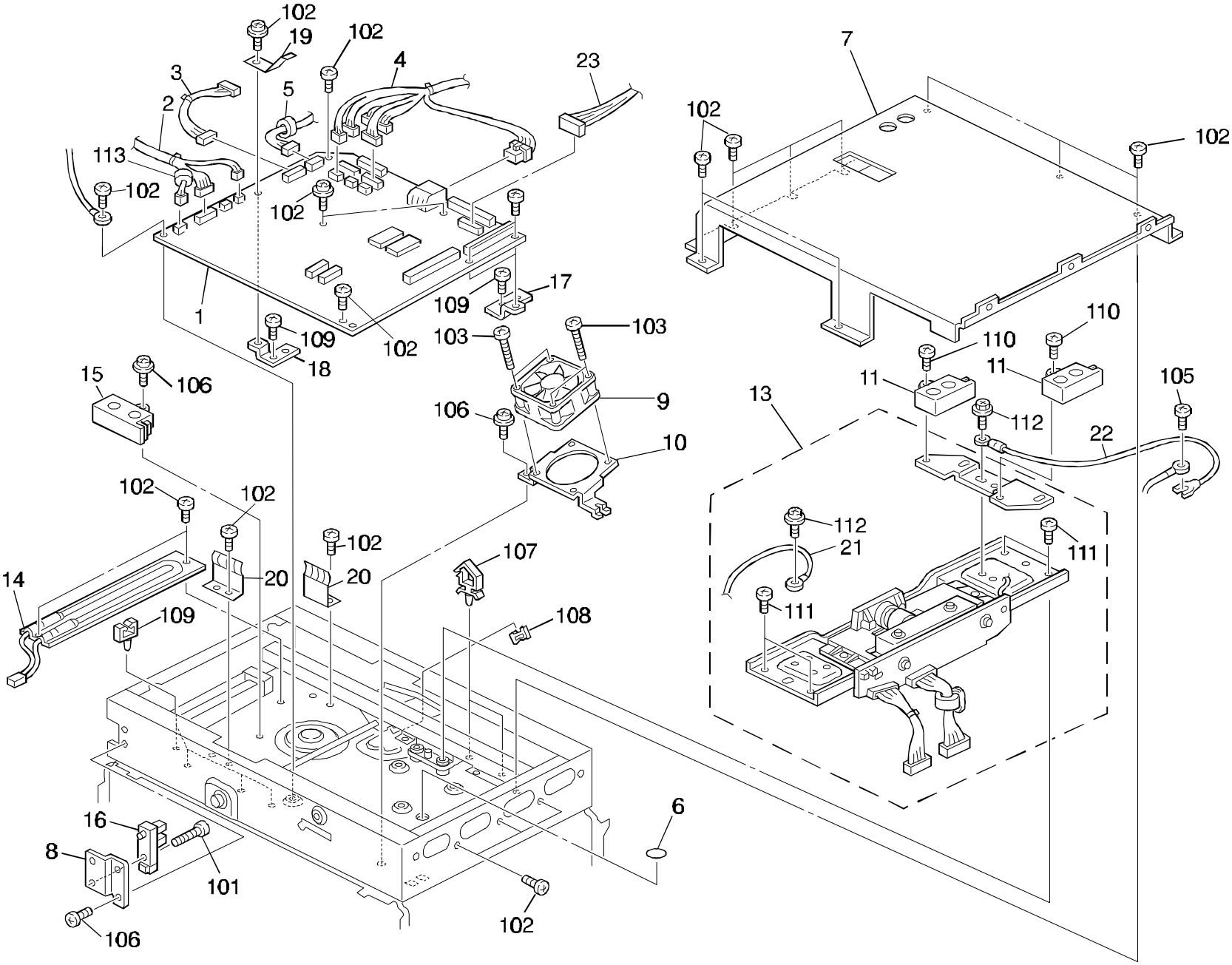


12. OPTICS SECTION 1 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AB03 2717	Pulley - 26Z	4
2	AA13 2174	Spacer - M8	2
3	A134 1791	Spring Plate - 2nd Mirror	4
4	A069 1883	Shoe - Scanner	8
5	A134 5360	Harness - Scanner Lamp	1
6	A134 1782	2nd Scanner Ass'y	1
7	AC03 0074	2nd Mirror	2
8	A134 1776	Spring Plate - 1st Mirror	2
9	AC03 0073	1st Mirror	1
10	AX52 0021	Scanner Lamp - 75V 200W	1
11	A133 7144	1st Scanner Ass'y	1
12	A134 1726	Wire Stopper Plate	2
13	A096 1873	Scanner Shoe Pin	8
14	AW11 0017	Thermostat - 140C - AC120V 15A	1
15	A134 1926	Exposure Glass Stopper	4
16	A134 5370	Relay Harness - Scanner Lamp	1
17	AA15 0636	Seal - 90x29.5x0.2	1
18	A134 1929	Bracket - Left Scale	1
19	A134 1933	Right Stopper - Exposure Glass	1
20	A134 1932	Stay - Scanner Upper Right	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0313 0140B	Philips Pan Head Screw - M3x14	
102	0443 0060B	Hexagon Tapping Screw - M3x6	
103	0353 0040B	Screw - M3X4	
104	0720 0060E	Retaining Ring - M6	
105	0802 5246	Screw - M3x5	

13. OPTICS SECTION 2 (A133)

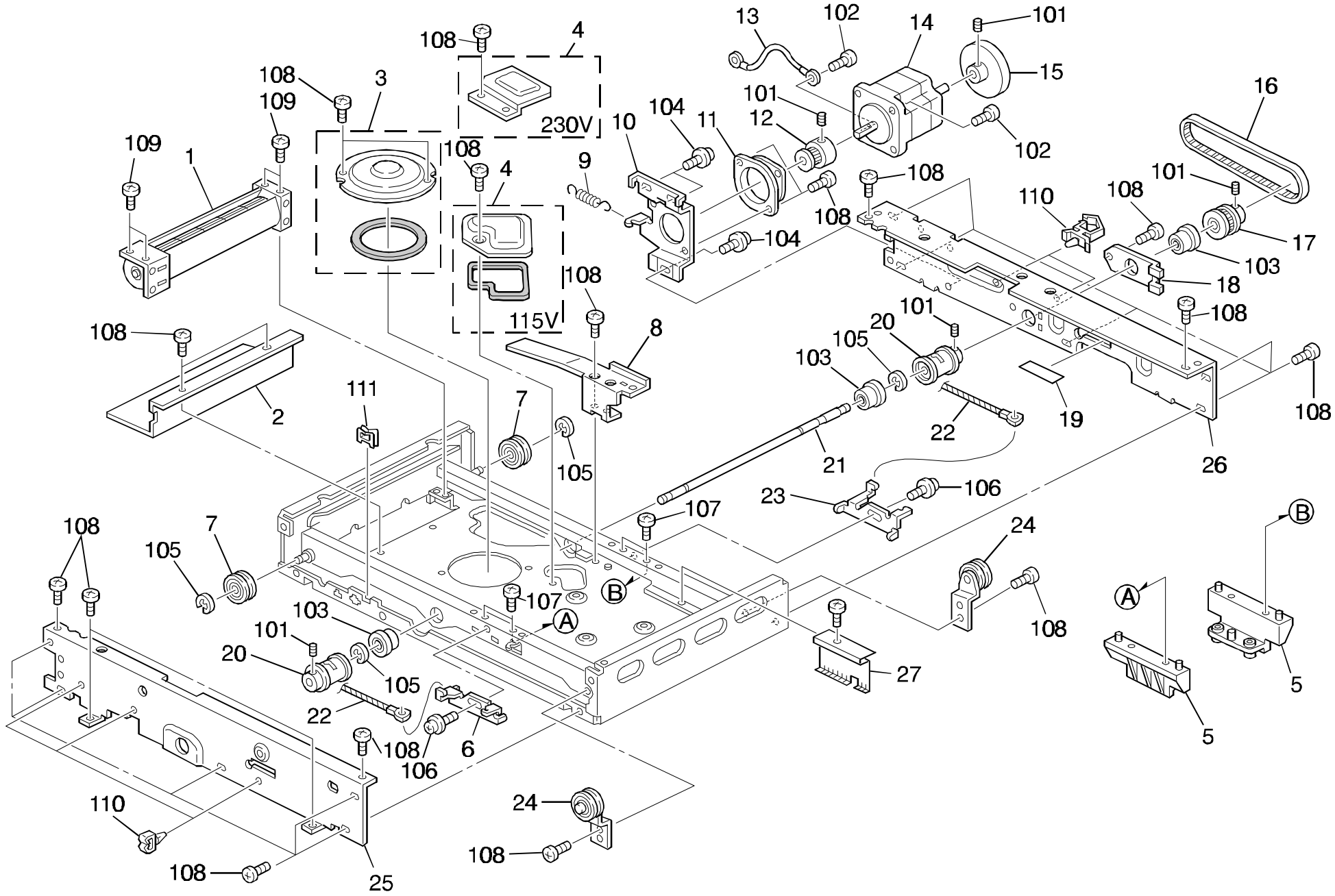


13. OPTICS SECTION 2 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A133 7890	EX-IPU Board	1
2	A134 5478	Scanner Harness - Front	1
3	A134 5396	Harness - LD Unit (115V)	1
4	A134 5476	Scanner Harness - Rear Left	1
5	A134 5396	Harness LD Unit (115V)	1
5	A133 7774	Harness LD Unit (230V)	1
6	AA15 0234	Mylar Seal - Base	1
7	A134 1955	Inner Cover - Scanner	1
8	A134 1962	Bracket Home Sensor	1
9	AX64 0060	Fan Motor - DC 0.96W	1
10	A134 1971	Bracket - Fan Motor	1
11	AW01 0072	Original Sensor	2
13	A130 1815	Lens Block Ass'y	1
14	AX40 0057	Heater - 115V 9W	1
14	AX40 0058	Heater - 230V 9W	1
15	AW01 0040	Original Sensor	1
16	AW02 0072	Photointerruptor	1
17	A133 7152	Right Bracket - IPU	1
18	A133 7151	Left Bracket - IPU	1
19	A133 7148	Spring Plate - Lens Block	1
20	A133 7145	Spring Plate - Scanner Rail	2
21	A133 7913	Grounding Wire - Lens Block 2	1
22	A133 7912	Grounding Wire - Lens Block 1	1
23	A133 7920	Harness HDD (230V)	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0314 0120B	Philips Pan Head Screw - M4x12	
102	0414 0060B	Tapping Screw - M4x6	
103	0314 0250B	Philips Pan Head Screw - M4x25	
105	0434 0060B	Philips Tapping Screw - M4x6	
106	0951 4006B	Philips Screw With Washer - M4x6	
107	1105 0310	Wire Clamp	
108	1105 0291	Wire Saddle	
109	1105 0329	Clamp - ES-0510	
110	0353 0080B	Screw - M3x8	
111	0354 0080B	Screw - M4x8	
112	0802 5246	Screw - M3x5	
113	1607 0663	Ferrite Core - TFC-20-10-10 (230V)	

14. OPTICS SECTION 3 (A133)

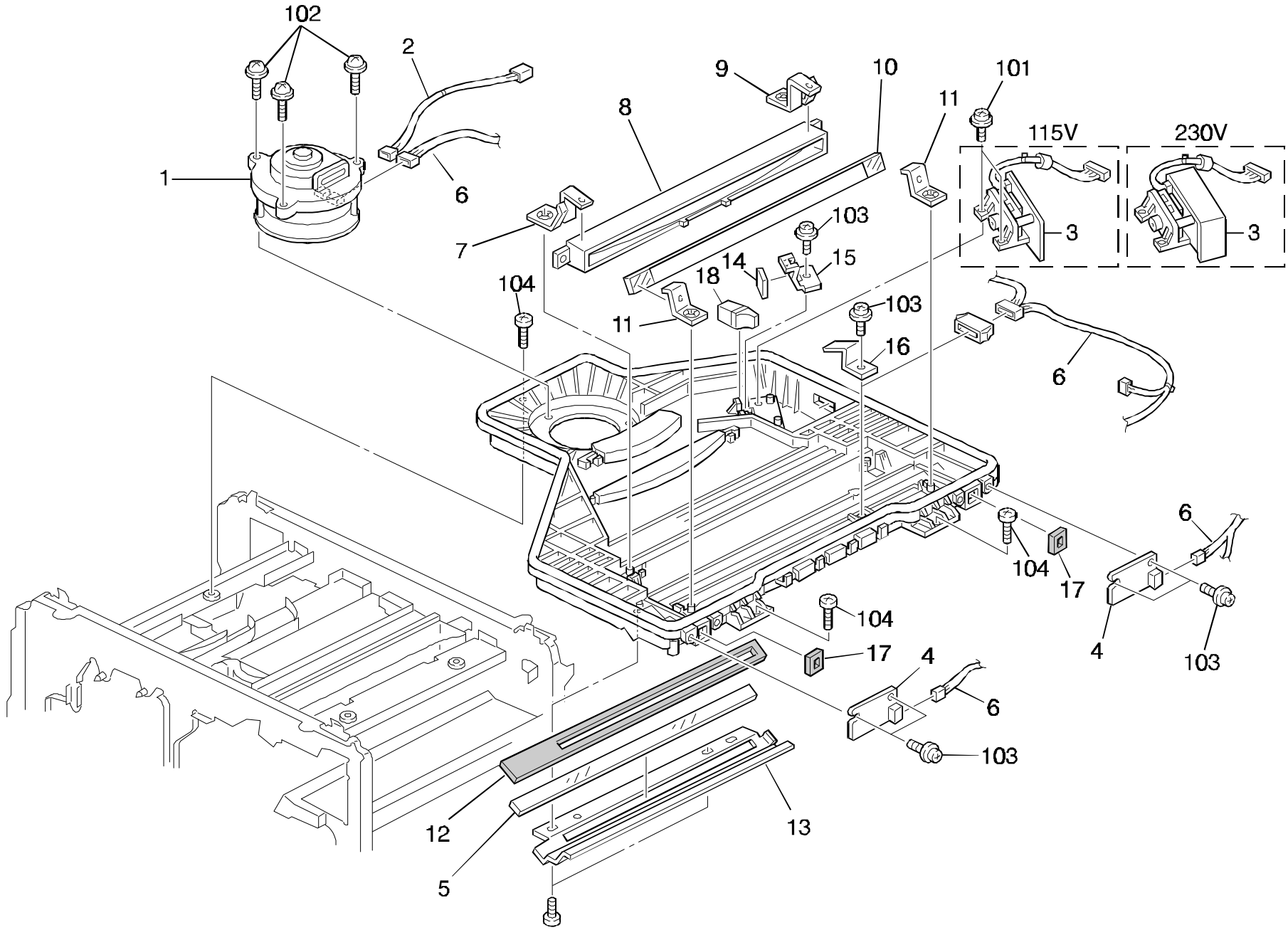


14. OPTICS SECTION 3 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AX65 0015	Fan Motor - DC 5.8W	1
2	A134 1959	Bracket - Exhaust Fan	1
3	A134 1662	Polygon Motor Cover	1
4	A134 1664	LD Unit Cover (115V)	1
4	A133 7159	LD Unit Cover (230V)	1
5	A133 7149	Lens Block Supporter	2
6	A134 1677	Front Tension Bracket	1
7	AB03 2717	Pulley - 26Z	2
8	A134 1964	Bracket - Flexible Harness	1
9	AA06 0221	Gripper Solenoid Spring	1
10	A134 1720	Bracket - Scanner Motor	1
11	A134 1724	Cushion - Stepper Motor	1
12	AB03 0459	Timing Pulley -22Z	1
13	A069 5352	Ground Wire - Scanner	1
14	AX06 0107	Motor - DC 24W	1
15	A134 1728	Fly Wheel	1
16	AA04 3372	Timing Belt - S2M400	1
17	AB03 0460	Timing Pulley - 44Z	1
18	A134 1722	Bracket - Drive Shaft	1
19	A134 1680	Guide - Flexible Harness	1
20	AB03 2718	Drive Pulley	2
21	AA14 0547	Drive Shaft	1
22	AA05 0085	Scanner Wire	2
23	A134 1678	Rear Tension Bracket	1
24	A134 1698	Idle Pulley	2
25	A134 1675	Front Scanner Frame	1
26	A134 1679	Rear Scanner Frame	1
27	A133 7146	Spring Plate - Rear Scanner Rail	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0575 0050E	Hexagon Headless Set Screw - M5x5	
102	0314 0100B	Philips Pan Head Screw - M4x10	
103	0805 3368	Ball Bearing - 8 X 16 X 5mm	
104	0951 4005B	Philips Screw With Flat Wash.- M4x5	
105	0720 0060E	Retaining Ring - M6	
106	0951 4006B	Philips Screw With Washer - M4x6	
107	0314 0080B	Philips Pan Head Screw - M4x8	
108	0434 0060B	Philips Tapping Screw - M4x6	
109	0353 0080B	Screw - M3X8	
110	1105 0310	Wire Clamp	
111	1105 0329	Clamp - ES-0510	

15. LASER SECTION (A133)

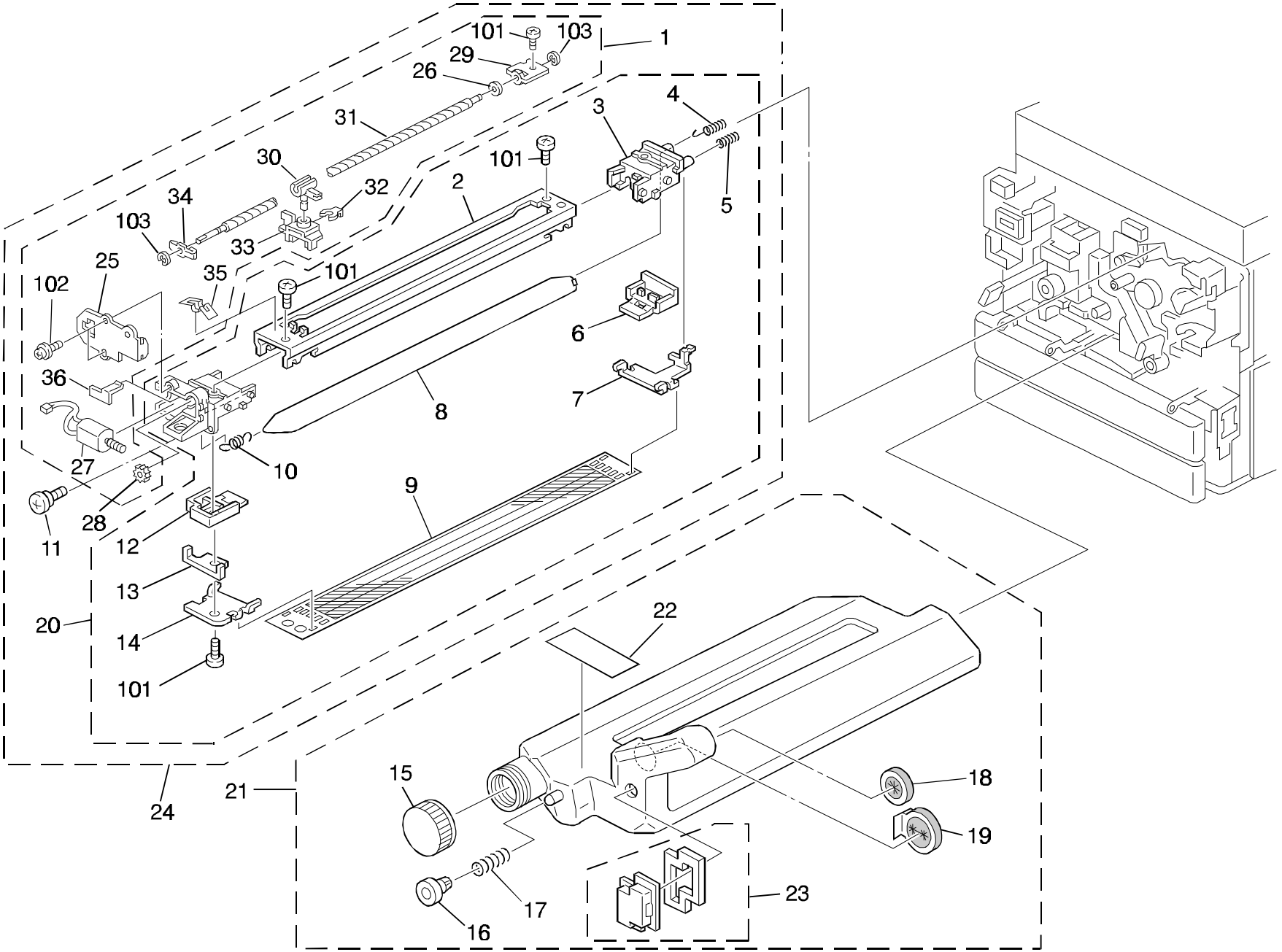


15. LASER SECTION (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AX06 0100	Polygon Mirror Motor	1
2	A134 5491	Relay Harness - Polygon Motor	1
3	A134 2085	LD Unit (115V)	1
3	A133 7173	LD Unit (230V)	1
4	A134 5190	LSD Board	2
5	AC01 5020	Toner Shield Glass	1
6	A134 5391	Harness - LSD	1
7	A134 2073	Right Btl Bracket	1
8	A134 2079	Btl Lens	1
9	A134 2074	Left Btl Bracket	1
10	AC03 0080	1st Mirror	1
11	A134 2071	Bracket - 1st Mirror	2
12	AA15 1900	Seal - Toner Shield Glass	1
13	A134 2083	Guide Plate - Toner Shield Glass	1
14	AC02 0090	Cylindrical Lens	1
15	A100 2056	Plate - Cylindrical Lens	1
16	A134 2129	Bracket - Mirror	1
17	AA15 2302	Seal	2
18	A133 7165	Guide Harness LD (230V)	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0951 4010B	Philips Screw With Washer - M4x10	
102	0802 5238	Tapping Screw - M4x12	
103	0802 5232	Tapping Screw - M3x8	

16. CHARGE CORONA SECTION (A133)

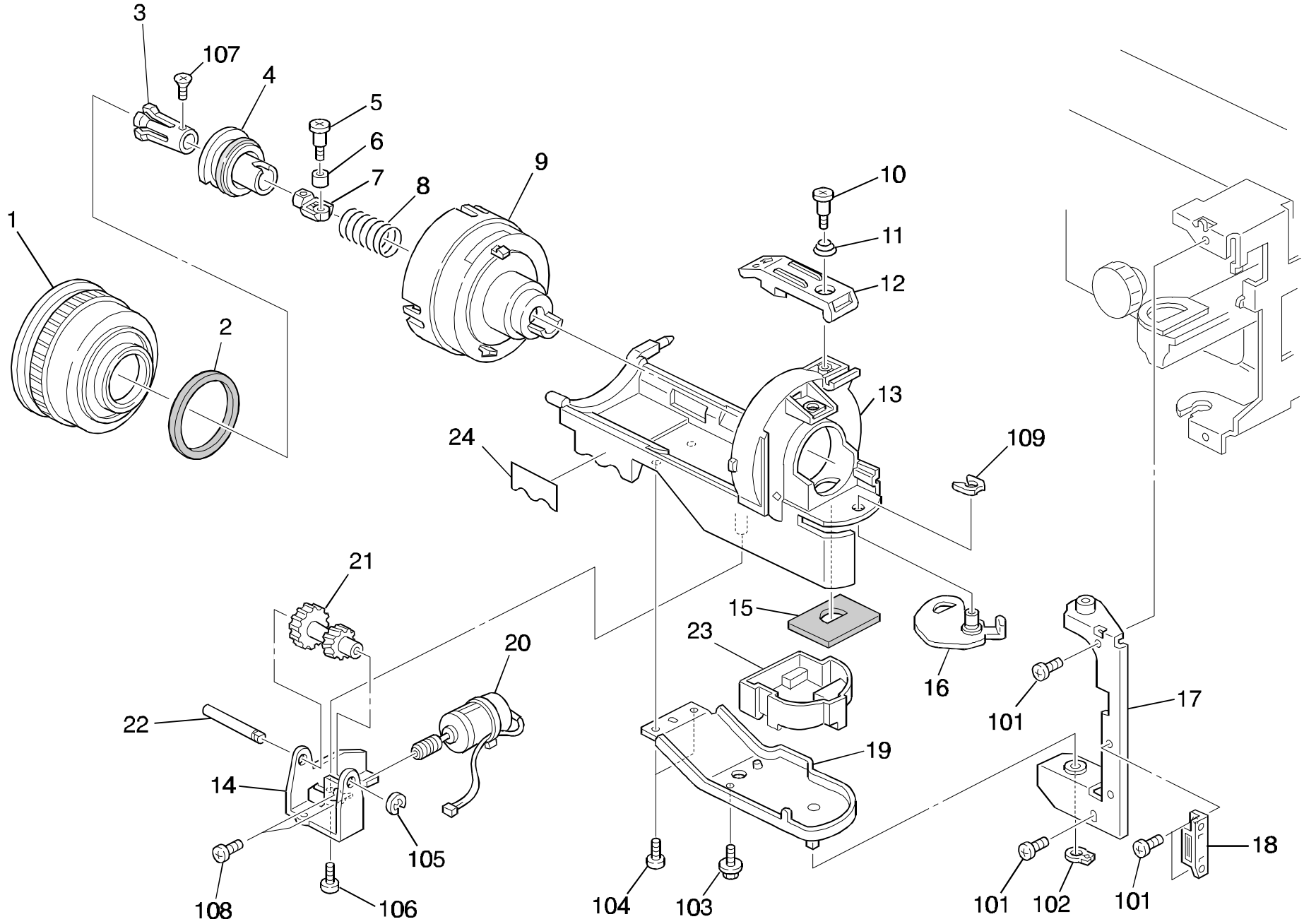


16. CHARGE CORONA SECTION (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AD02 2283	Front End Block	1
2	AD02 3106	Charge Corona Casing	1
3	AD02 2285	Rear End Block	1
4	AA06 3248	Charge Terminal Spring	1
5	AA06 3249	Grid Terminal Spring	1
6	AD02 2307	Cover - Rear End Block	1
7	A096 2051	Rear Grid Anchor	1
8	AD02 0053	Charge Corona Wire	1
9	A096 2057	Charge Corona Grid	1
10	AA06 2284	Pressure Spring	1
11	AA14 3424	Knob Screw - M4x8	1
12	AD02 2306	Cover - Front End Block	1
13	A134 2363	Terminal Plate	1
14	A096 2052	Front Grid Anchor	1
15	A134 2380	Toner Collection Bottle Cap	1
16	A134 2387	Cap - Spring	1
17	AA06 3270	Pressure Spring	1
18	A134 2382	Upper Sponge - Collection Bottle	1
19	A134 2383	Lower Sponge - Collection Bottle	1
20	AD00 4075	Charge Corona Unit	1
21	A133 7238	Decal - Toner Collection Bottle	1
22	AA00 0180	Decal - Toner Collection (LT)	1
22	AA00 0181	Caution Decal - Toner Collect. Tank (A4)	1
23	A134 2384	Toner Overflow Sensor Ass'y	1
24	A134 9011	Charge Corona Unit	1
25	A096 2053	Cleaner Motor Cover	1
26	AA16 1105	Cleaner Cushion	1
27	AX04 0061	Cleaner Motor - DC 0.5W	1
28	AB01 0087	Gear - 20Z	1
29	AA08 0148	Rear Bushing	1
30	A096 2062	Wire Cleaner Slider	1
31	A096 2061	Screw Shaft	1
32	A096 2065	Slider Ring	1
33	A096 2063	Corona Wire Cleaner	1
34	AA08 0147	Front Bushing	1

Index No.	Part No.	Description	Q'ty Per Assembly
35	A096 2054	Grounding Plate	1
36	A096 2055	Motor Grounding Plate	1
101	0971 4006A	Philips Polycarbonate Screw - M4x6	
102	0965 3008B	Tapping Screw With Washer - M3x8	
103	0720 0025E	Retaining Ring - M2.5	

17. TONNER BOTTLE SECTION (A133)

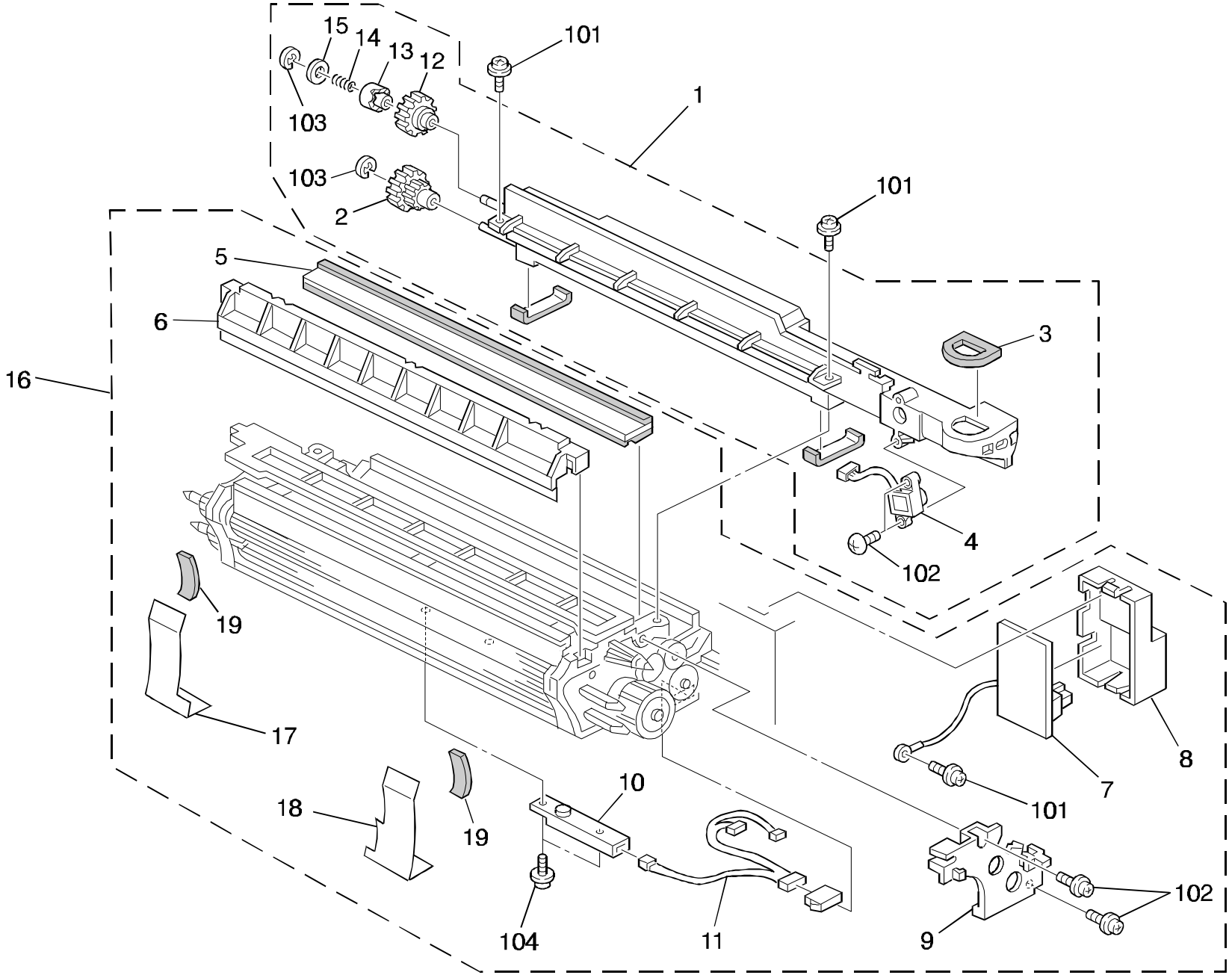


17. TONNER BOTTLE SECTION (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 3185	Gear - Toner Bottle (RIC - 230V)	1
1	A133 3185	Gear - Toner Bottle (RIC - 115V)	1
1	A133 3195	Gear - Toner Bottle (SVN/INF/NRG)	1
2	AA15 1894	Seal - 67x53x2	1
3	A134 3180	Bottle Chuck	1
4	A134 3177	Toner Slider	1
5	AA14 3712	Chuck Shaft	1
6	A134 3181	Chuck Roller	1
7	A134 3179	Chuck Shaft	1
8	AA06 3366	Chuck Spring	1
9	A134 3190	Toner Bottle Stopper	1
10	AA14 3410	Stepped Screw - M4	1
11	AA06 3367	Pressure Spring	1
12	A134 3197	Bottle Holder	1
13	A134 3172	Toner Bottle Holder	1
14	A134 3161	Bottle Drive Bracket	1
15	AA15 1891	Shutter Seal	1
16	A134 3171	Shutter - Toner Bottle	1
17	A134 3164	Bracket - Toner Holder	1
18	AG07 0004	Magnetic Catch	1
19	A134 3157	Bottle Holder Bracket	1
20	A134 3162	Bottle Drive Motor DC 5.85w	1
21	AB01 7347	Idle Gear	1
22	AA14 8413	Idle Gear Shaft	1
23	A134 3212	Toner Receive Plate	1
24	AA00 1369	Decal - Adding Toner	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0434 0060B	Philips Tapping Screw - M4x6	
102	0725 0100E	Retaining Ring C - M10	
103	0443 0060B	Hexagon Tapping Screw - M3x6	
104	0802 5231	Tapping Screw - M3x6	
105	0720 0040E	Retaining Ring - M4	
106	0802 5233	Tapping Screw - M3x10	
107	0323 0060B	Philips Sunk Screw - M3x6	
108	0800 0072	Philips Pan Head Screw - M2.6x4	
109	0805 0088	Retaining Ring - M6	

18. DEVELOPMENT UNIT 1 (A133)

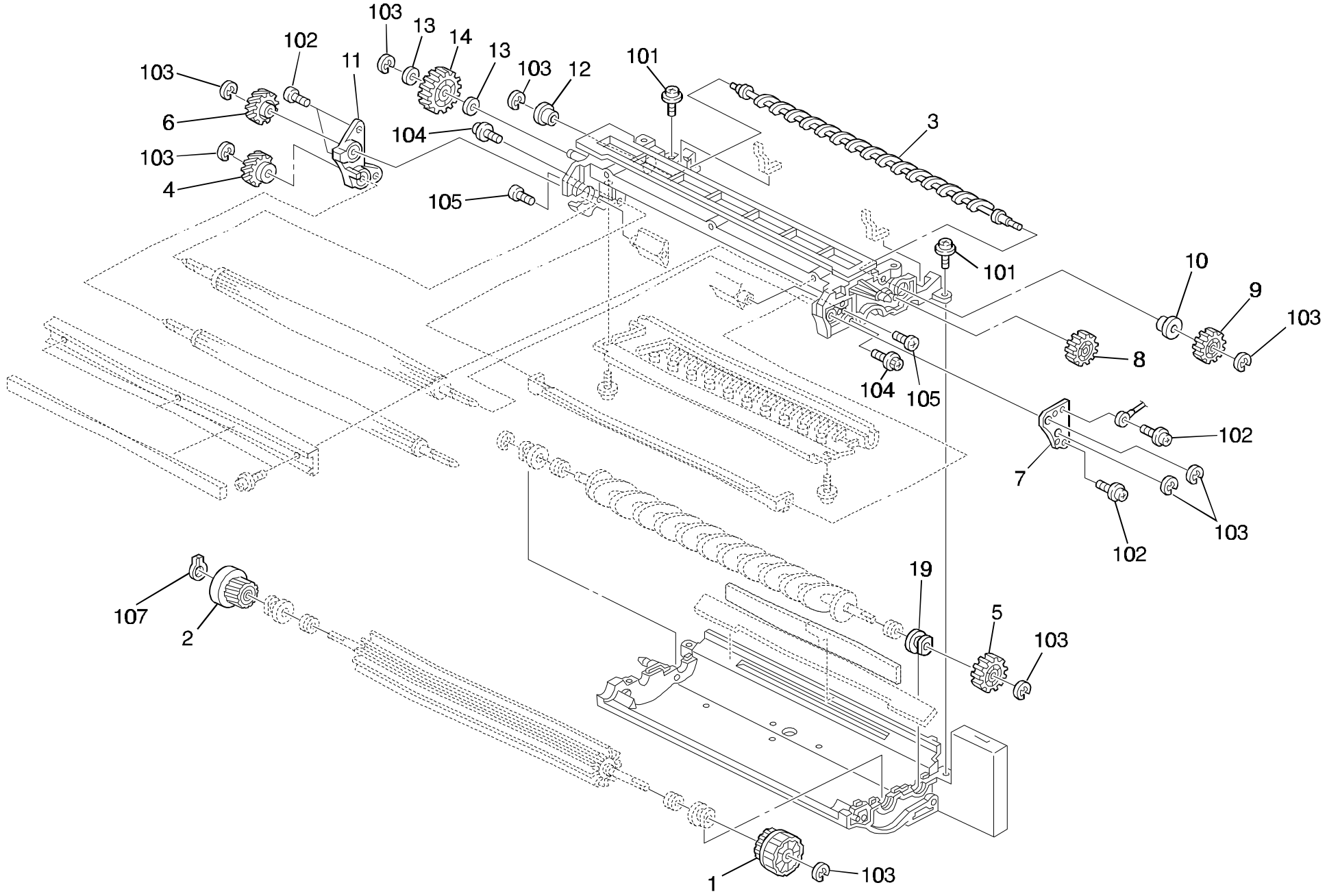


18. DEVELOPMENT UNIT 1 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 3120	Toner Supply Unit	1
2	AB01 3886	Gear - 18Z	1
3	AA15 1889	Entrance Seal - Toner Supply Unit	1
4	AW31 0004	Toner Detect Sensor	1
5	A134 3090	Development Filter	1
6	A134 3060	Entrance Seal - Development	1
7	AZ30 0039	Power Pack - Development	1
8	A134 3088	Cover - Power Pack	1
9	A134 3095	Front Cover - Development	1
10	AW23 0008	ID Sensor	1
11	A134 5306	Harness - Development Unit	1
12	AB01 3887	Gear - 16Z	1
13	A134 3145	Disk - Torque Limiter	1
14	AA06 3382	Pressure Spring	1
15	5446 3108	Spacer - 1.5x4.2x11mm	1
16	A134 3051	Development Unit	1
17	A134 3056	Rear Seal - Development Roller	1
18	A134 3055	Front Seal - Development Roller	1
19	AA15 1882	Seal - 32x4x1	2

Index No.	Part No.	Description	Q'ty Per Assembly
101	0951 4008B	Philips Screw With Washer - M4x8	
102	0802 5232	Tapping Screw - M3x8	
103	0720 0040E	Retaining Ring - M4	
104	0353 0060B	Philips Pan Head Screw - M3x6	

19. DEVELOPMENT UNIT 2 (A133)

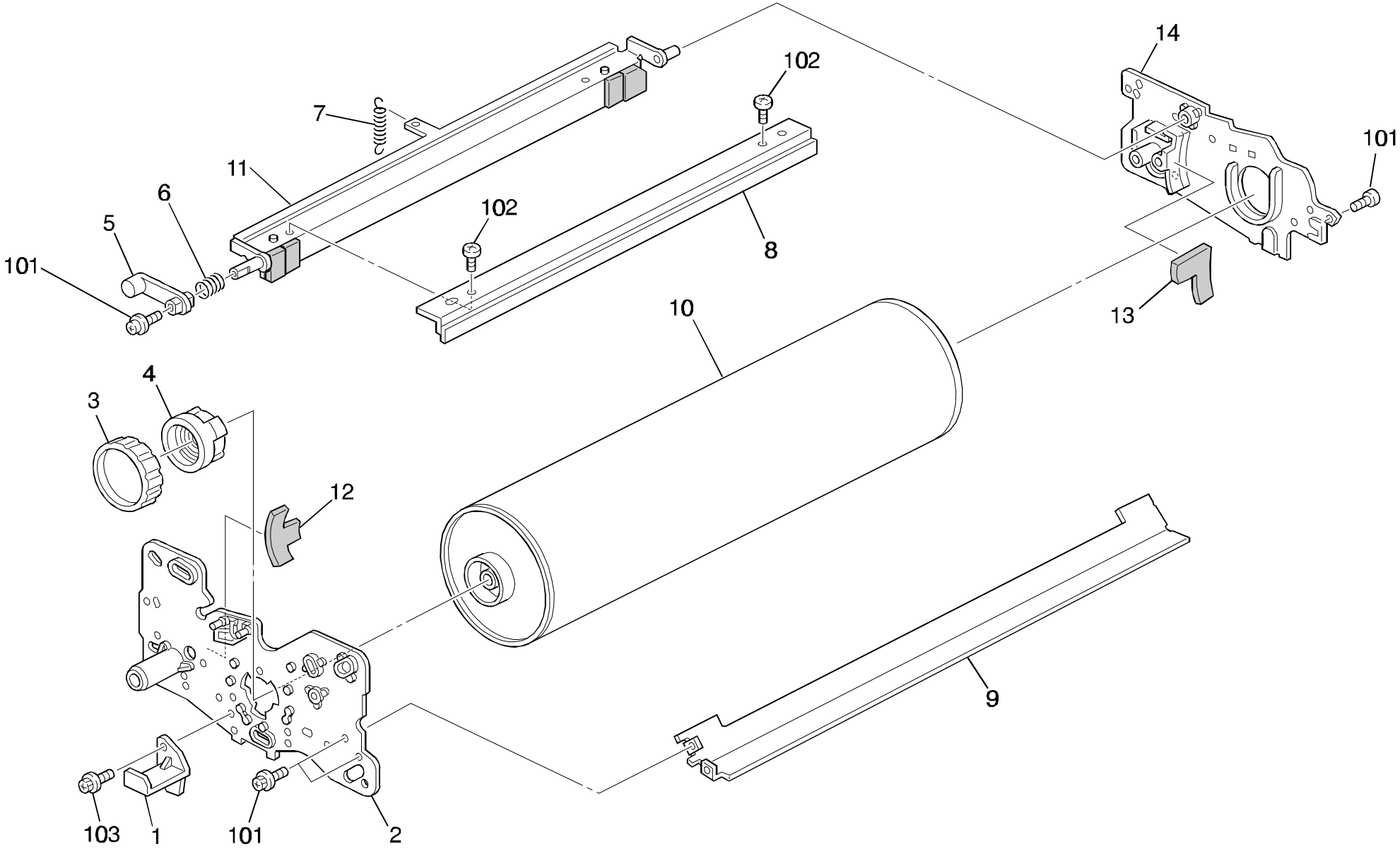


19. DEVELOPMENT UNIT 2 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AB01 3878	Gear - 29Z	1
2	AB01 1150	Gear - 20Z	1
3	AD03 7043	Development Auger	1
4	AB01 1162	Gear - 16Z	1
5	AB01 3877	Gear - 28Z	1
6	AB01 1161	Gear - 20Z	1
7	A134 3086	Fixing Plate - Development	1
8	AB01 3880	Gear - 20Z	1
9	AB01 3879	Gear - 20Z	1
10	AA08 0176	Bushing	1
11	AA08 4047	Bushing Case	1
12	AA08 0178	Bushing - M5	1
13	AA13 2094	Spacer - Mounting Arm	2
14	AB01 1163	Gear - 33Z	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0802 5238	Tapping Screw - M4x12	
102	0443 0060B	Hexagon Tapping Screw - M3x6	
103	0434 0060B	Philips Tapping Screw - M4x6	
104	0443 0080B	Tapping Screw - M3x8	
105	0802 5232	Tapping Screw - M3x8	
106	0802 5237	Binding Self-tapping Screw - M4x10	
107	0720 0040E	Retaining Ring - M4	

20. DRUM UNIT (A133)

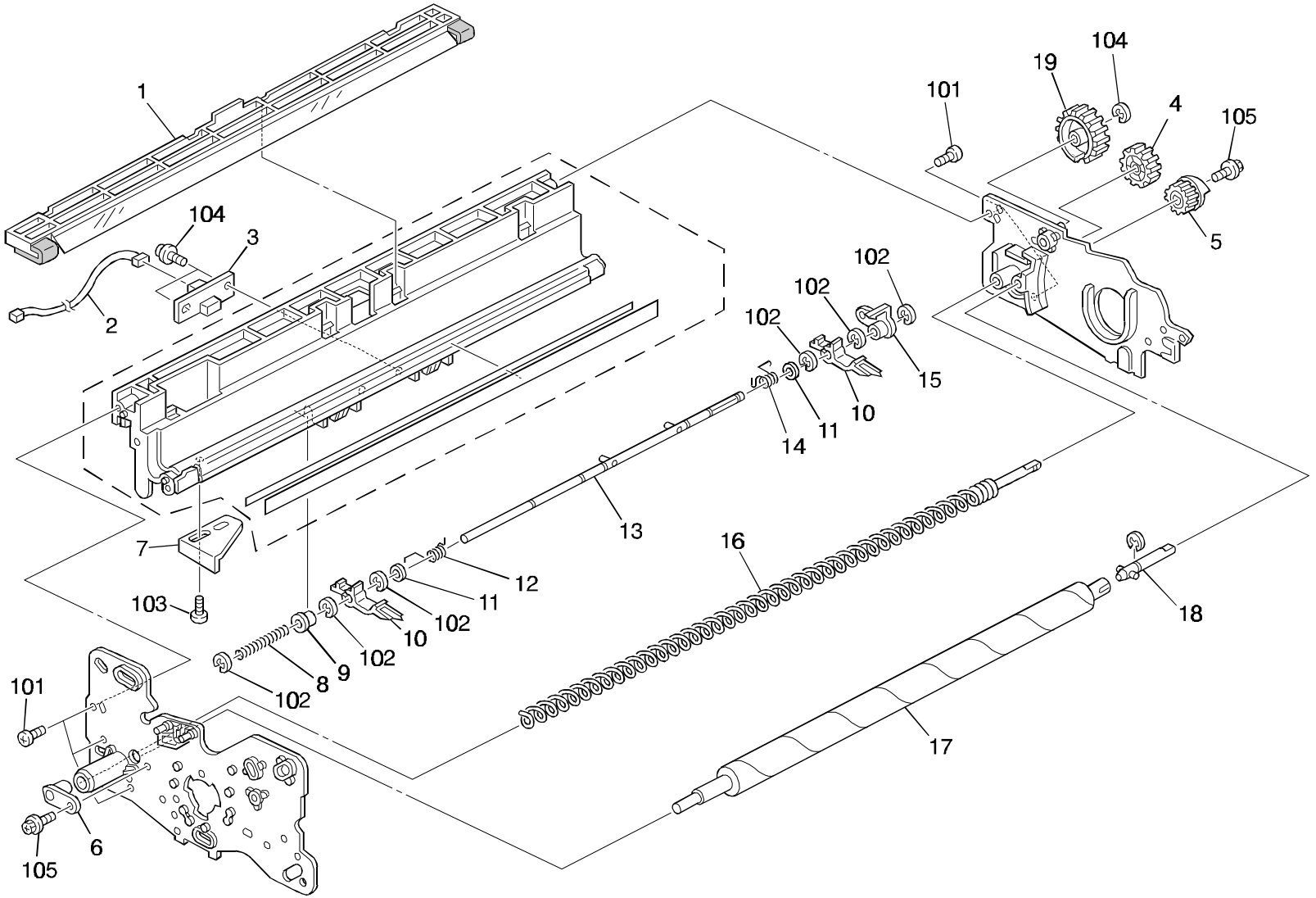


20. DRUM UNIT (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 2268	Front Drun Stand	1
2	A134 2252	Front Drum Plate	1
3	A096 2330	Drum Shaft Knob	1
4	A134 2300	Bushing - Drum	1
5	A096 3575	Blade Release Lever	1
6	AA06 3269	Pressure Spring	1
7	5853 1190	Spring - Click Plate	1
8	A134 2275	Cleaning Blade	1
9	A134 2259	Right Drum Stay	1
10	A133 9510	OPC Drum	1
11	A134 2271	Bracket - Cleaning Blade	1
12	A134 2391	Front Drum Seal	1
13	A134 2392	Rear Drum Seal	1
14	A134 2255	Rear Drum Plate	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0443 0050B	Philips Pan Head Screw - M3x6	
102	0314 0060B	Philips Pan Head Screw - M4x6	
103	0443 0080B	Tapping Screw - M3x8	

21. CLEANING UNIT (A133)

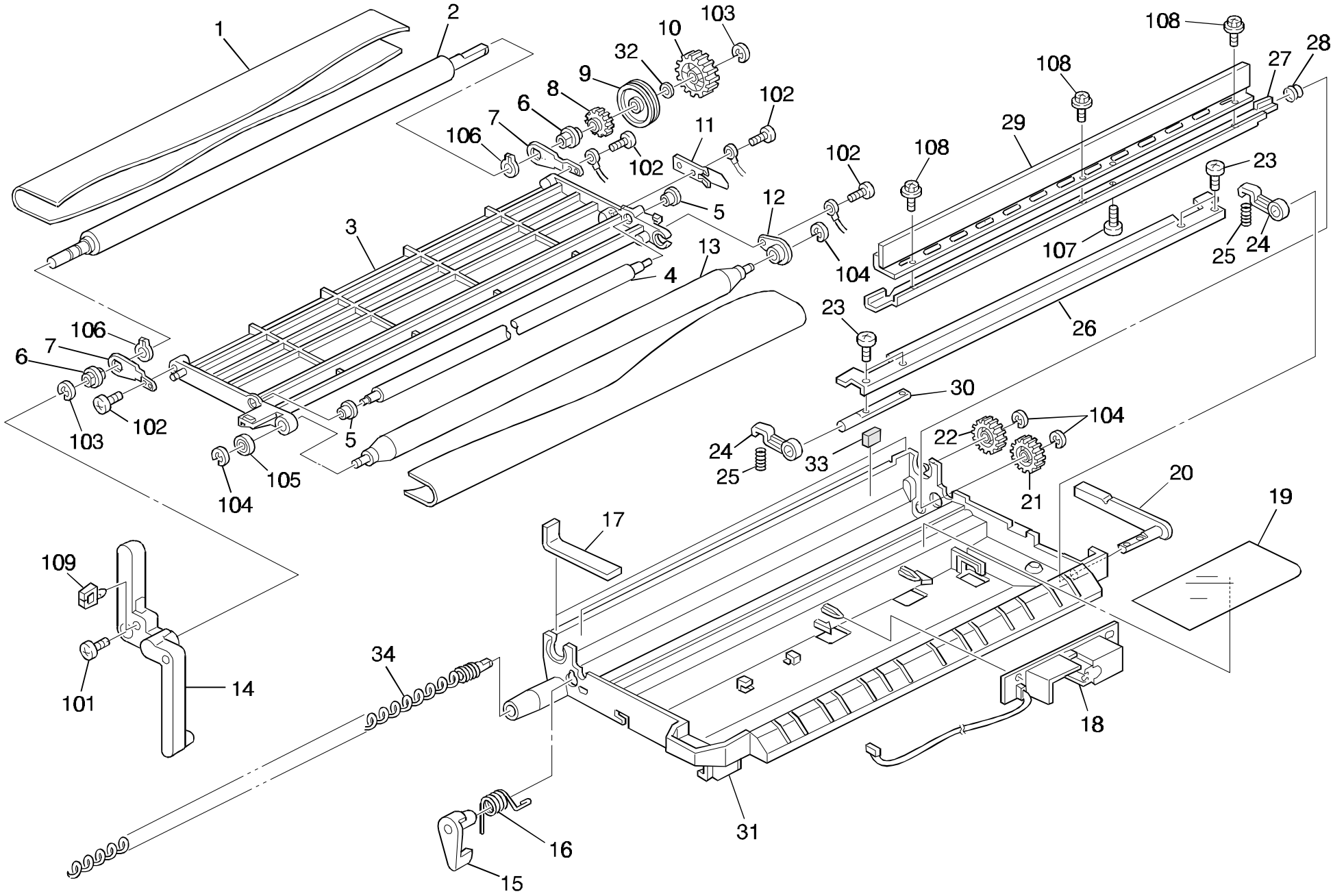


21. CLEANING UNIT (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 2284	Cleaning Case Cover	1
2	A134 5310	Harness - ID Sensor	1
3	A134 5251	ID Sensor	1
4	AB01 3873	Gear - 26Z	1
5	A134 2278	Joint Gear - Cleaning	1
6	AA08 2045	Cleaning Brush Bushing	1
7	A134 2269	Positioning Plate - Pick-off Pawl	1
8	AA06 3373	Spring - 60mm	1
9	5324 1658	Bushing- 4x8x4.5mm	1
10	AD02 5020	Pick-off Pawl	2
11	A352 2138	Slide Collar - 0.6x4.5x6	2
12	AA06 6250	Pressure Spring	1
13	A096 3646	Pick-off Pawl Shaft	1
14	AA06 6251	Pressure Spring	1
15	AA08 0155	Rear Pawl Bushing	1
16	AD04 3033	Toner Collection Coil	1
17	AD04 2029	Cleaning Roller	1
18	A134 2277	Drive Shaft - Cleaning Roller	1
19	AB01 7323	Cam Gear - 35z	1

Index No.	Part No.	Description	Q'ty Per Assembly
102	0720 0030E	Retaining Ring - M3	
103	0802 5237	Binding Self-tapping Screw - M4x10	
104	0802 5232	Tapping Screw - M3x8	
105	0443 0050B	Philips Pan Head Screw - M3x6	

22. TRANSFER BELT UNIT (A133)

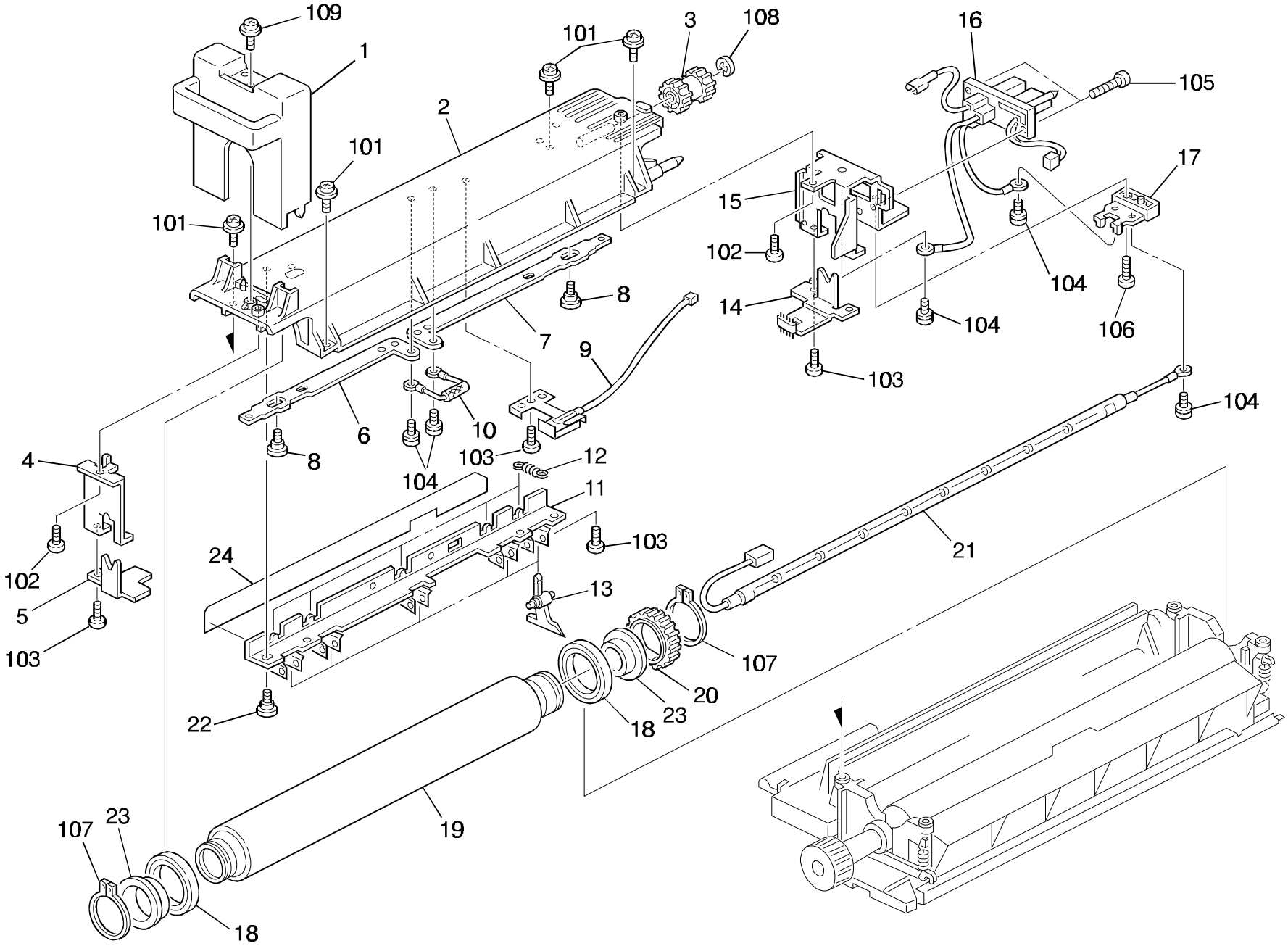


22. TRANSFER BELT UNIT (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 3850	Transfer Belt	1
2	A134 3872	Drive Roller - Transfer	1
3	A134 3854	Frame - Transfer Unit	1
4	A134 3880	Bias Roller - Transfer	1
5	AA08 2054	Bushing - M4	2
6	AA08 2051	Bushing - M8	2
7	A134 3856	Side Plate Drive Roller	2
8	AB01 3892	Gear - 18Z	1
9	A134 3891	Bushing - Drive Roller	1
10	AB01 3891	Gear - 30Z	1
11	A134 3860	Terminal Plate - Bias Roller	1
12	A134 3865	Bushing - Driver Roller	1
13	A134 3875	Driven Roller Transfer	1
14	A134 3998	Supporter - Transfer Unit	1
15	A134 3935	Lever - Transfer Belt Cleaning	1
16	AA06 6240	Pressure Spring	1
17	AA15 1922	Seal - 12x75x4	2
18	AZ30 0040	Power Pack - Transfer Unit	1
19	A134 3908	Seal - Power Pack - Transfer	1
20	A134 3915	Rear Release Lever	1
21	AB01 3569	Gear - 20Z	1
22	5205 2612	Gear - 19T	1
23	5875 2088	Shoulder Screw - M4	4
24	A134 3914	Front Release Lever	2
25	5219 1958	Spring - Lens Guide	2
26	A134 3912	Release Stay	1
27	A134 3934	Stay - Transfer Belt Cleaning	1
28	A134 3937	Bushing - Belt Cleaning	1
29	A134 3940	Cleaning Blade - Transfer Belt	1
30	AA14 3713	Shaft - Release Stay	1
31	A134 3903	Casing - Transfer Belt	1
32	AA13 2025	Spacer - 1x8x12	1
33	A079 3054	Seal - 3x5x8mm	1
34	A134 3960	Toner Collection Coil - Transfer	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0414 0080B	Binding Self-tapping Screw - M4x8	
102	0434 0060B	Philips Tapping Screw - M4x6	
103	0720 0060E	Retaining Ring - M6	
104	0720 0040E	Retaining Ring - M4	
105	0805 3490	Bushing - 5x10x4mm	
106	0725 0120E	Retaining Ring C - M12	
107	0313 0080B	Philips Pan Head Screw - M3x8	
108	0443 0060B	Hexagon Tapping Screw - M3x6	
109	1105 0229	Clamp	

23. FUSING UNIT 1 (A133)

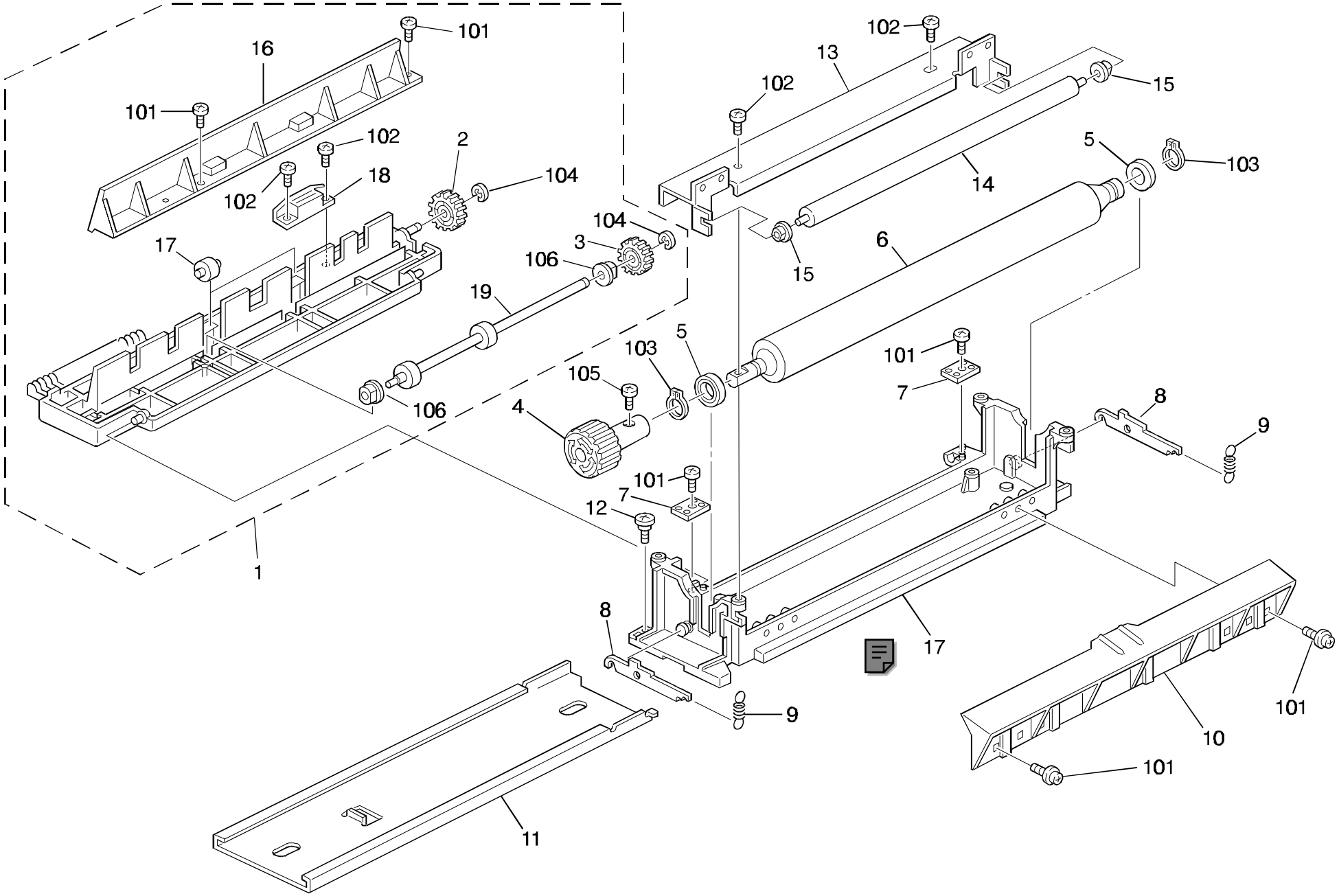


23. FUSING UNIT 1 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 4130	Fusing Front Cover	1
2	A134 4050	Fusing Cover	1
3	AB01 3883	Idle Gear - 25Z	1
4	A134 4075	Front Bracket - Fusing Lamp	1
5	A134 4102	Fusing Lamp Holder - Front	1
6	A134 4063	Bias Plate - Thermofuse	1
7	A134 4061	Rear Terminal Plate	1
8	AA14 3715	Stepped Screw - M5	2
9	A134 5266	Thermistor	1
10	A134 5265	Thermofuse	1
11	A153 4112	Stripper Bracket	1
12	AA06 0103	Solenoid Spring	5
13	AE04 4013	Hot Roller Stripper	5
14	A134 4103	Fusing Lamp Holder - Rear	1
15	A134 4084	Connector Bracket - Fusing	1
16	A134 5300	Fusing Harness - 115V	1
16	A133 7745	Fusing Harness - 230V	1
17	A134 4085	Terminal Plate - Fusing	1
18	AE03 0021	Bushing - 30x42x27	2
19	AE01 1036	Hot Roller	1
20	AB01 3985	Gear - 40Z	1
21	AX44 0088	Fusing Lamp - 120V 790W (115V)	1
21	AX44 0089	Fusing Lamp - 230V 790W (230V)	1
22	AA14 3062	Shoulder Screw - M4	1
23	AE03 2018	Bushing - 25x30x9	2

Index No.	Part No.	Description	Q'ty Per Assembly
101	0951 4010B	Philips Screw With Washer - M4x10	
103	0314 0060B	Philips Pan Head Screw - M4x6	
104	0950 4006M	Philips Screw With Flat Washer-M4x6	
105	0313 0080B	Philips Pan Head Screw - M3x8	
106	0314 0100B	Philips Pan Head Screw - M4x10	
107	0725 0250E	Retaining Ring C - M25	
108	0720 0060E	Retaining Ring - M6	

24. FUSING UNIT 2 (A133)

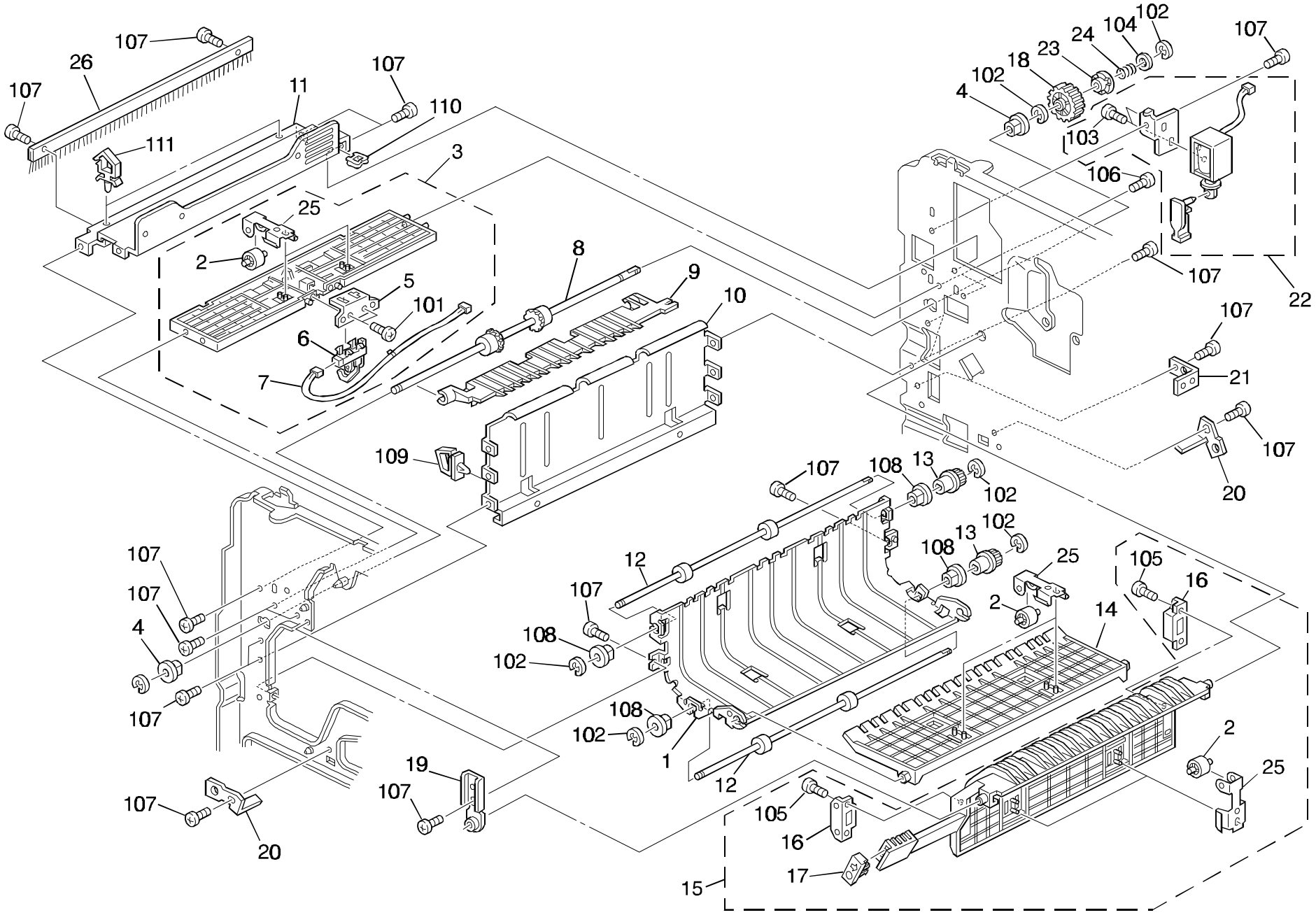


24. FUSING UNIT 2 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 4006	Fusing Exit Unit	1
2	AB01 3885	Idle Gear - 20Z	1
3	AB01 3884	Exit Gear - 17Z	1
4	AG05 0076	Fusing Knob	1
5	AE03 0022	Bearing - 12x24x64m	2
6	AE02 0055	Pressure Roller	1
7	A134 4301	Exit Guide Hinge	2
8	A134 4161	Pressure Lever	2
9	AA06 0658	Spring	2
10	A134 4195	Fusing Entrance Guide	1
11	A134 4153	Slide Rail - Fusing	1
12	5203 1686	Screw - Slid Rail	1
13	A134 4201	Cleaning Roller Bracket	1
14	AE04 2009	Cleaning Roller	1
15	AA08 2063	Bushing - 8x10x5	2
16	A134 4280	Fusing Exit Guide - Lower	1
17	AF04 0548	Exit Driven Roller	2
18	AG07 0009	Magnetic Catch	1
19	AF02 0326	Exit Roller Ass'y	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0802 5236	Tapping Screw - M4x8	
102	0434 0082B	Tapping Screw - M4x8	
103	0725 0120	Retaining Ring C - M12	
104	0720 0040E	Retaining Ring - M4	
105	0950 4008B	Philips Screw With Spring Waser - M4x8	
106	0805 3480	Bushing - 6mm	

25. PAPER EXIT SECTION (A133)

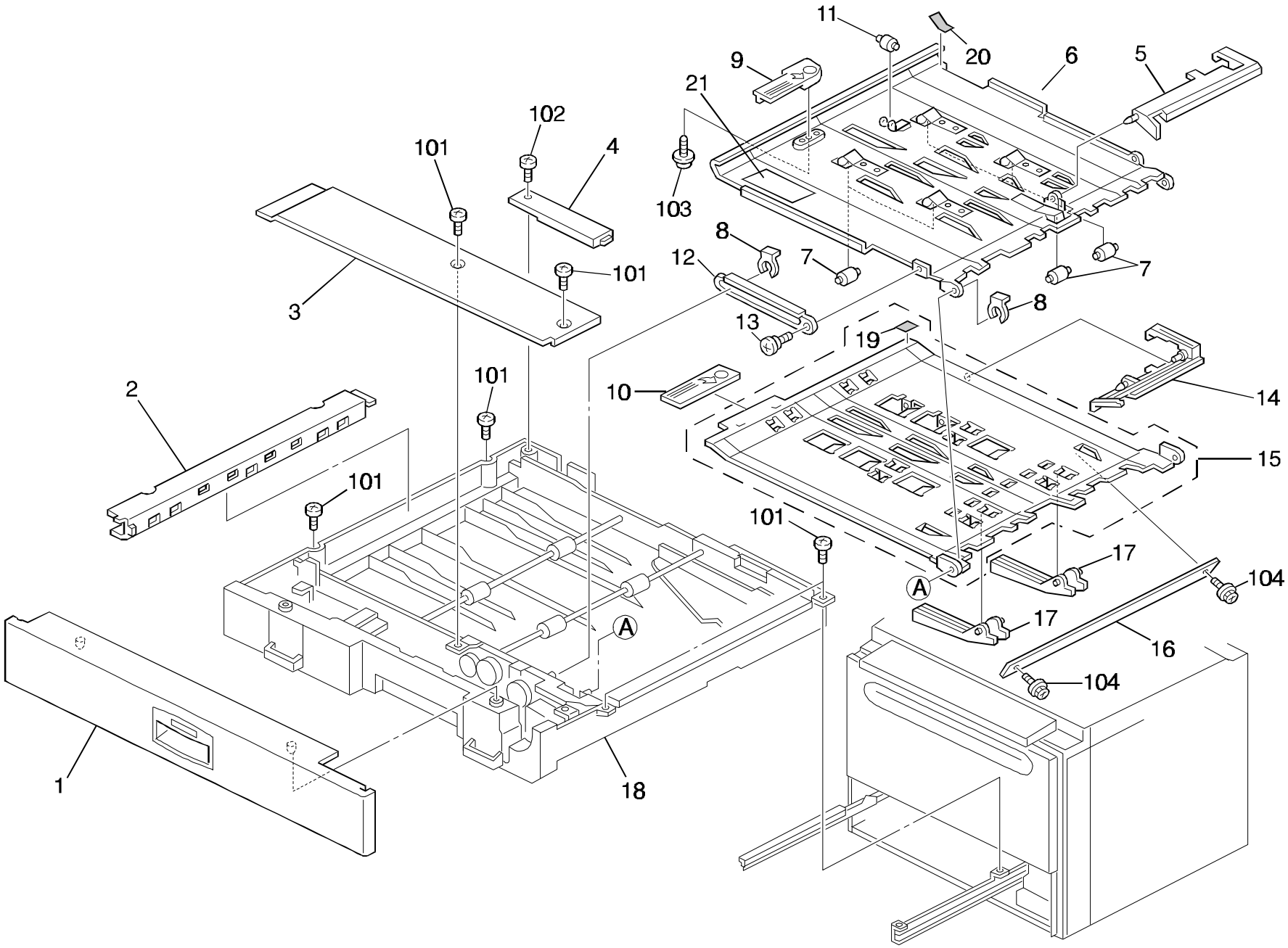


25. PAPER EXIT SECTION (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 4464	Left Reverse Guide	1
2	AF04 0031	Upper Exit Roller	6
3	A134 4450	Upper Exit Guide	1
4	AA08 2058	Bushing - 6x10x9mm	2
5	A134 4456	Bracket - Exit Sensor	1
6	AW02 0071	Photointerruptor - Actuator	1
7	A134 5479	Harness - Exit Sensor	1
8	AF02 0327	Exit Roller	1
9	AF02 5023	Exit Pick-off Pawl	1
10	A133 7521	Exit Cover	1
11	A134 1092	Lamp Stabilizer Stay	1
12	AF02 0328	Relay Drive Roller	2
13	AB03 0475	Pulley - 18Z S2M	2
14	A134 4465	Turn Guide - Right Lower	1
15	A134 4460	Turn Gate - Right Upper Ass'y	1
16	AG07 0004	Magnetic Catch	2
17	A134 4458	Exit Unit Knob	1
18	AB01 3889	Gear - 24Z	1
19	A134 4455	Upper Guide Bracket	1
20	A134 4468	Lower Guide Plate	1
21	A134 4467	Left Bracket - Turn Gate	1
22	A134 4471	Stripper Solenoid	1
23	A470 1703	Shift Clutch	1
24	A470 1704	Spring - Lower Exit Roller	1
25	A134 4453	Roller Holder	6
26	5215 4497	Exit Antistatic Brush	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0802 5237	Binding Self-tapping Screw - M4x10	
102	0720 0040E	Retaining Ring - M4	
103	0313 0040B	Philips Pan Head Screw - M3x4	
104	0701 0060B	Flat Washer - M6	
105	0802 5085	Tapping Screw - M4x8	
106	0802 5236	Tapping Screw - M4x8	
107	0434 0060B	Philips Tapping Screw - M4x6	
108	0805 3480	Bushing - 6mm	
109	1105 0291	Wire Saddle	
110	1105 0328	Harness Clamp - ES-0505	

26. DUPLEX UNIT 1 (A133)

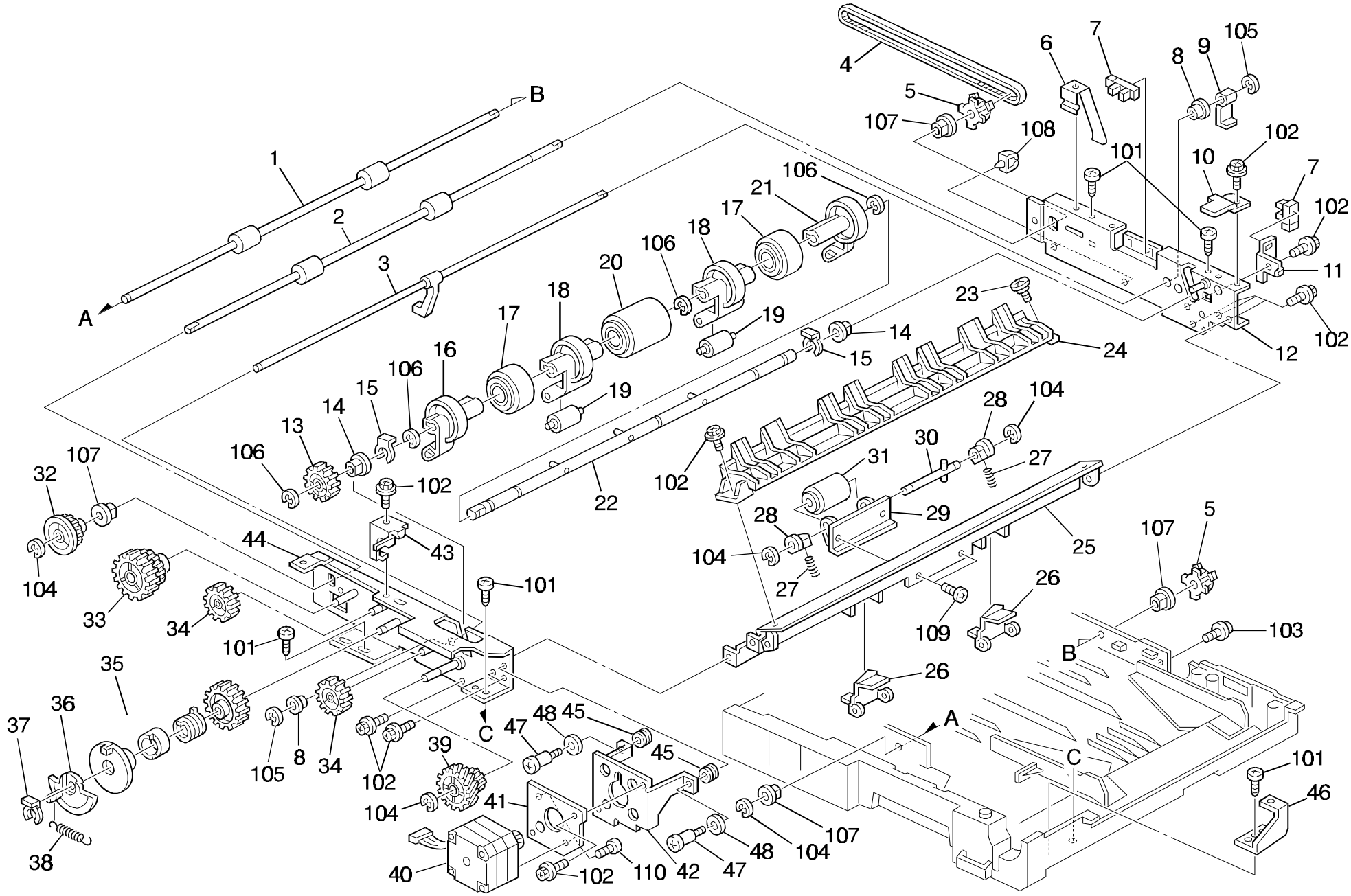


26. DUPLEX UNIT 1 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 2956	Paper Feed Front Cover	1
2	A134 4720	End Fence Upper Cover	1
3	A134 4701	Front Upper Cover	1
4	A134 4721	Connector Cover	1
5	A134 4728	Inverter Feeler	1
6	A134 4732	Upper Guide Plate	1
7	AF02 2077	Driven Roller	5
8	5206 2686	Snap Ring	2
9	A134 4726	Guide Plate Knob	1
10	A134 4739	Lower Guide Plate Knob	1
11	AF04 0031	Upper Exit Roller	1
12	A134 4619	Guide Plate Link	1
13	5447 2768	Stepped Screw - M3	1
14	A134 4730	Entrance Feeler	1
15	A134 4740	Lower Guide Plate	1
16	AA12 0067	Antistatic Brush	1
17	A154 4616	Paper Holder (RIC)	2
18	AF01 0018	Duplex Tray	1
19	AA16 2069	Guide Plate Pad	1
20	AA16 2068	Guide Plate Pad	1
21	A134 4884	Decal - Duplex Misfeed Removal	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0344 0080F	Philips Truss Head Screw - M4x8	
102	0802 5236	Tapping Screw - M4x8	
103	0802 5231	Tapping Screw - M3x6	
104	0443 0060B	Hexagon Tapping Screw - M3x6	

27. DUPLEX UNIT 2 (A133)

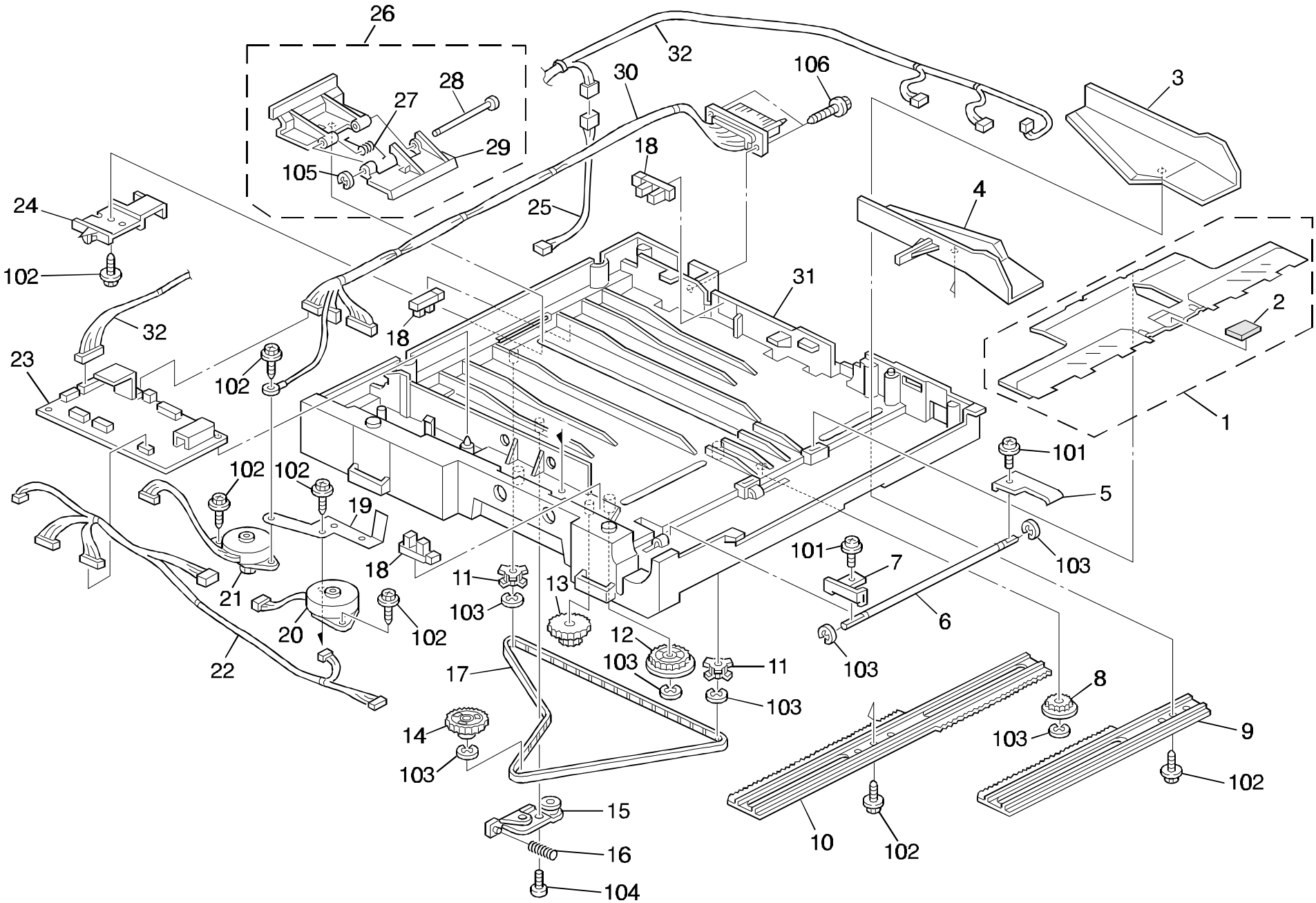


27. DUPLEX UNIT 2 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AF02 0319	Transport Roller	1
2	AF02 0320	Right Transport Roller	1
3	A134 4676	Paper End Feeler	1
4	AA04 3373	Timing Belt - S2M308	1
5	AB03 0474	Pulley - 24Z	2
6	A134 4765	Grounding Plate	1
7	AW02 0075	Photointerrupter	2
8	5443 2668	Bushing - 4x6x7mm	2
9	AA11 1208	Paper End Sensor Feeler	1
10	A134 4804	Guide Plate Stopper	1
11	A134 4790	Paper End Sensor	1
12	A134 4781	Rear Side Plate	1
13	AB01 1166	Gear - 33Z	1
14	5304 1639	Bushing - 8mm	2
15	5215 2621	Snap Ring - M6	2
16	A134 4809	Front Guide Holder	1
17	AF02 0317	Stack Roller	2
18	A134 4649	Paper Guide Holder	2
19	AF02 2077	Driven Roller	2
20	AF03 1024	Feed Roller	1
21	A134 4808	Rear Guide Holder	1
22	A134 4512	Feed Roller Shaft	1
23	AA14 3307	Stepped Screw - M3x4	1
24	A134 4508	Inverter Guide Plate	1
25	A134 4662	Duplex Guide Plate	1
26	A134 4658	Vibrating Plate	2
27	AA06 3385	Pressure Spring	2
28	AA08 0128	Bushing - 6x9x8	2
29	A134 4671	Bracket - Separation Roller	1
30	A134 4646	Separation Roller Shaft	1
31	AF03 2026	Separation Roller	1
32	AB01 1167	Gear - 25Z	1
33	AB01 7332	Gear - 24Z/41Z	1
34	AB01 1165	Gear - 32Z	1
35	AB04 0015	Spring Clutch - Tray Bottom Plate	1

Index No.	Part No.	Description	Q'ty Per Assembly
36	A334 4706	Disk - Bottom Plate Clutch	1
37	5447 2681	Snap Ring	1
38	AA06 0593	Spring	1
39	AB01 7337	Gear - 15Z/55Z	1
40	A134 5290	Transport Drive Motor	1
41	A134 4800	Motor Bracket	1
42	A134 4799	Motor Bracket	1
43	A134 4690	Clutch Stopper	1
44	A134 4751	Front Side Plate	1
45	AA16 1067	Cushion - Motor	3
46	A134 4712	Right Cover Bracket	1
47	A079 3626	Stepped Screw - Swing Cleaning	3
48	AA13 2184	Motor Cushion	3
101	0802 5236	Tapping Screw - M4x8	
102	0443 0060B	Hexagon Tapping Screw - M3x6	
103	0951 4008B	Philips Screw With Washer - M4x8	
104	0720 0040E	Retaining Ring - M4	
105	0720 0030E	Retaining Ring - M3	
106	0720 0060E	Retaining Ring - M6	
107	0805 3385	Bushing - 6mm	
108	1105 0199	Clamp	
109	0434 0060B	Philips Tapping Screw - M4x6	
110	0313 0050B	Philips Pan Head Screw - M3x5	
111	0443 0060W	Hexagon Head Tapping Screw - M3x6	

28. DUPLEX UNIT 3 (A133)

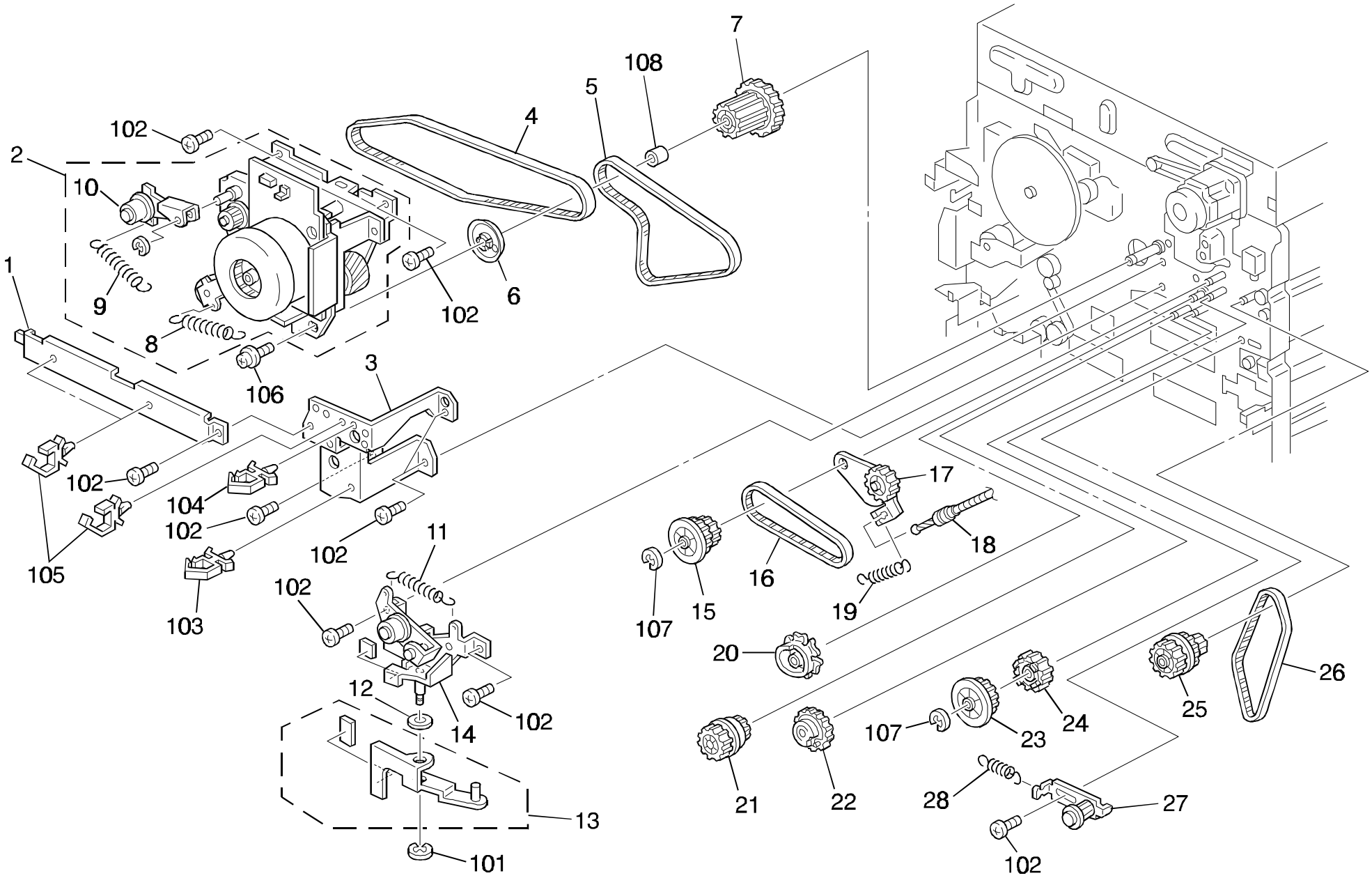


28. DUPLEX UNIT 3 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A154 4620	Bottom Plate	1
2	AF01 3003	Bottom Plate Pad - Duplex	1
3	AF01 6160	Rear Side Fence	1
4	AF01 6161	Front Side Fence	1
5	A134 4654	Bottom Pressure Plate	1
6	AA14 0291	Bottom Plate Shaft	1
7	A491 4690	Bottom Plate Hook	1
8	G011 3305	Gear - 16T	1
9	A134 4689	Rear Side Fence Rack	1
10	A134 4688	Front Side Fence Rack	1
11	AB03 0473	End Fence Pulley - 22Z	2
12	AB01 3881	Gear - 31Z	1
13	AB01 7400	Gear- 18Z/68Z	1
14	AB01 7339	End Fence Gear - 22Z/58Z	1
15	A134 4714	Tightener	1
16	AA06 3370	Spring	1
17	AA04 3374	Timing Belt - S2M800	1
18	AW02 0075	Photointerrupter	3
19	A134 4620	Grounding Plate	1
20	A134 5291	Jogger Drive Motor DC 6.48W	1
21	A134 5292	Jogger Drive Motor DC 10.56W	1
22	A134 5323	Motor Harness	1
23	A134 5254	Duplex Control Board	1
24	A134 4710	End Fence Actuator	1
25	A134 5322	End Fence Harness	1
26	A134 4525	End Fence Ass'y	1
27	AA06 6094	End Fence Spring	1
28	AA14 8252	End Fence Shaft	1
29	AF01 7014	End Fence	1
30	A134 5320	Duplex Main Harness	1
31	AF01 0018	Duplex Tray	1
32	A134 5321	Sensor Relay Harness	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0951 3006B	Philips Screw With Flat Washer-M3x6	
102	0802 5232	Tapping Screw - M3x8	
103	0720 0040E	Retaining Ring - M4	
104	0802 5236	Tapping Screw - M4x8	
105	0720 0025E	Retaining Ring - M2.5	
106	0443 0122B	Hexagonal Tapping Screw - M3x12	

29. DRIVE SECTION 1 (A133)

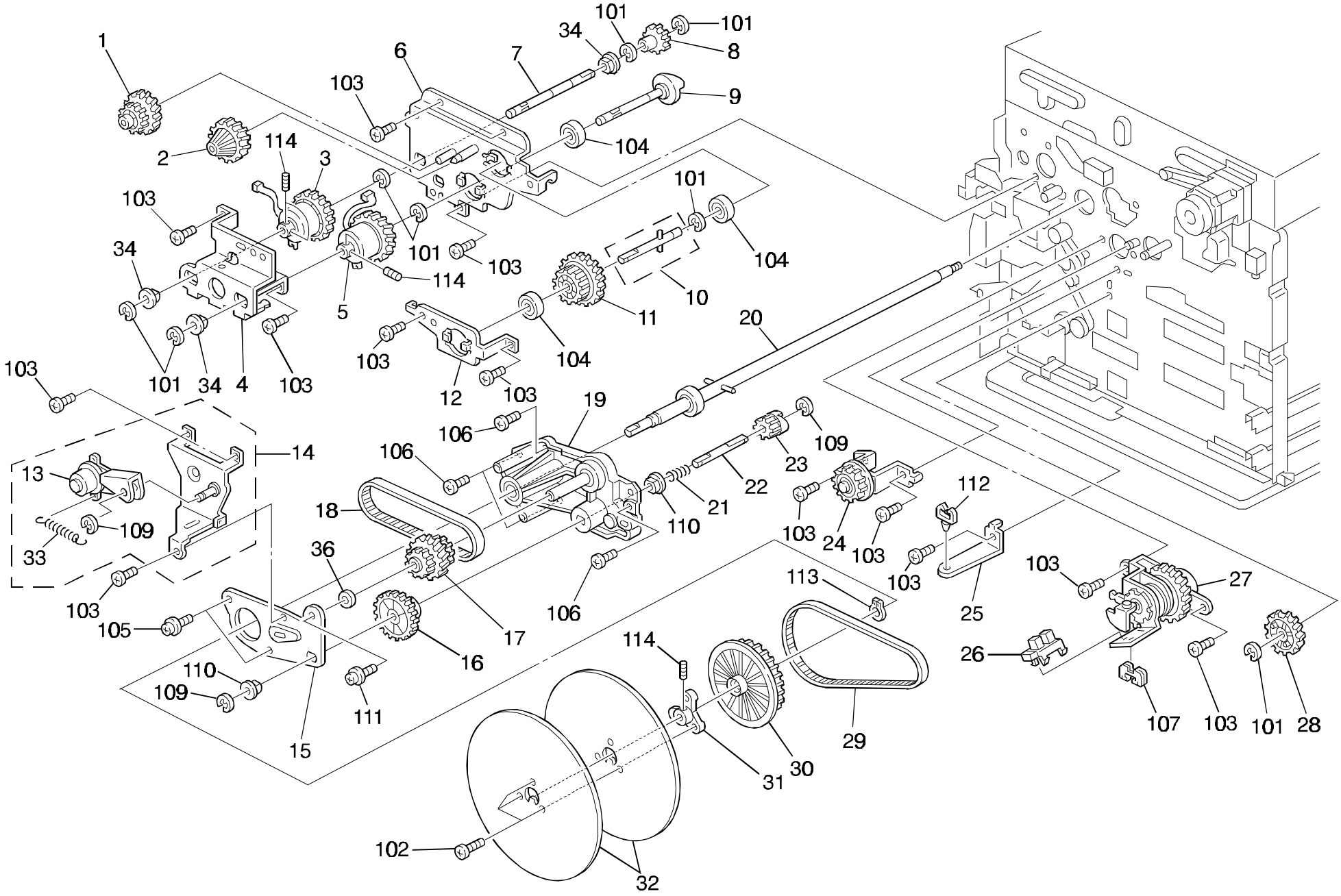


29. DRIVE SECTION 1 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 5828	Long Bracket - Main Harness	1
2	AX07 0009	Motor - DC 63w	1
3	A134 5819	Left Upper Bracket - DC Supply	1
4	AA04 3368	Timing Belt - S3M609	1
5	AA04 3367	Timing Belt - S3M432	1
6	A134 2574	Flange - Gear	1
7	AB01 7342	Timing Pulley - 36/25Z	1
8	5013 0815	Pressuer Spring	1
9	AA06 0189	Spring - Stripper Pawl Plate	1
10	A134 1105	Arm - Tightener	1
11	AA06 2271	Release Spring	1
12	AA13 2013	Spacer - 8.2	1
13	A134 1154	Release Lever - Fusing Drive	1
14	A134 1150	Tension Bracket - Fusing Drive	1
15	AB01 7345	Timing Pulley - 35Z	1
16	AA04 3369	Timing Belt - S3M267	1
17	A134 1121	Joint Gear	1
18	AA05 1022	Drive Wire	1
19	AA06 0604	Spring - 230gf	1
20	A134 2370	Cam - Toner Collection Bottle	1
21	AB01 7344	Timing Rulley - 25/20Z	1
22	5215 3872	Gear - 45T	1
23	AB03 0463	Fusing Cam Pulley	1
24	AB01 3872	Fusing Cam Gear - 28Z	1
25	AB01 7346	Exit Gear	1
26	AA04 3411	Timing Belt - S2M 300	1
27	A134 4481	Tightener Bracket	1
28	5414 4630	Bottle Spring	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0720 0040E	Retaining Ring - M4	
102	0434 0060B	Philips Tapping Screw - M4x6	
103	1105 0292	Wire Saddle	
104	1105 0316	Clamp	
105	1105 0413	Harness Clamp	
106	0951 4008B	Philips Screw With Washer - M4x8	
107	0720 0060E	Retaining Ring - M6	
108	0707 8100B	Bushing - M8x10	

30. DRIVE SECTION 2 (A133)

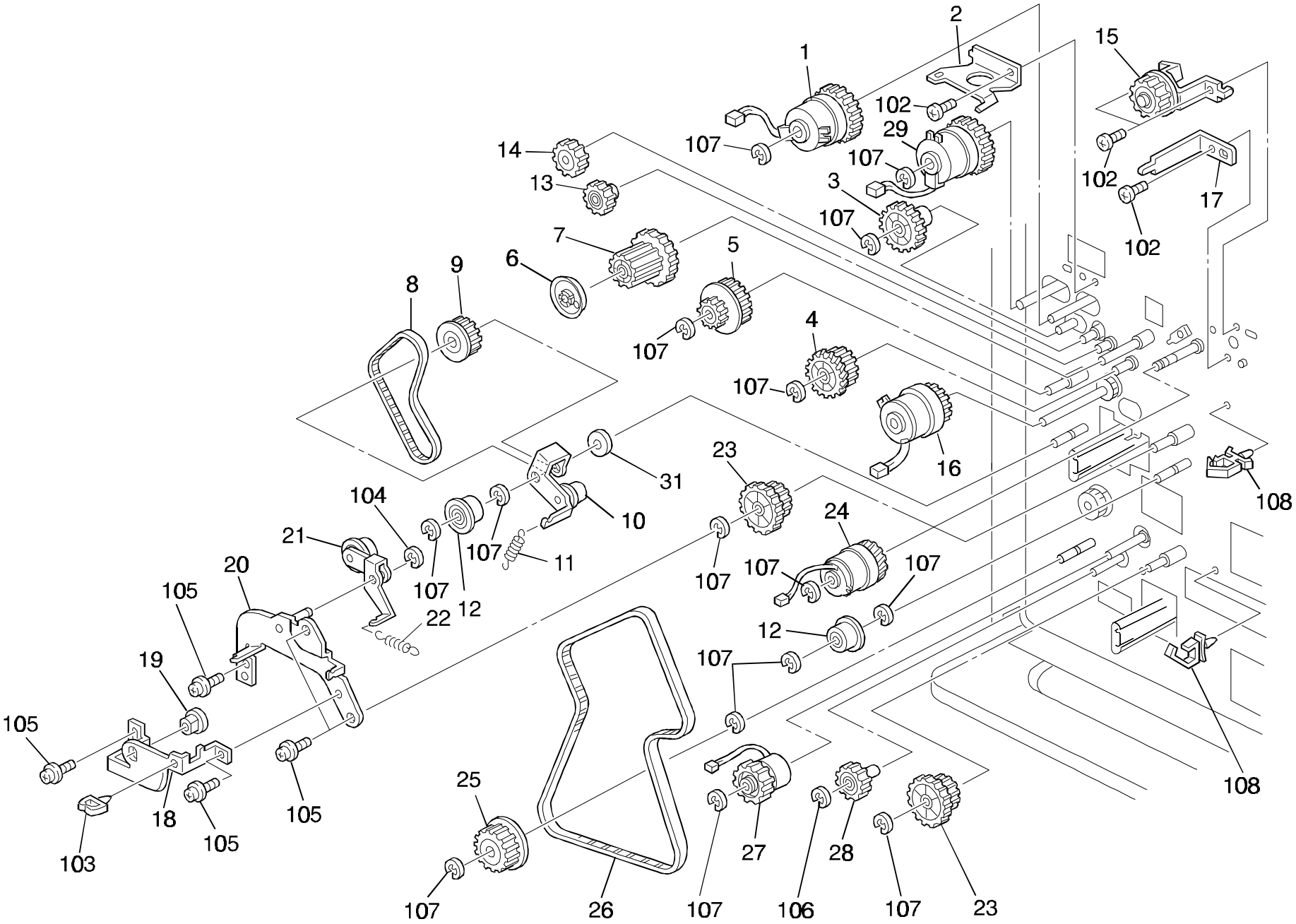


30. DRIVE SECTION 2 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AB01 7352	Gear - 41/22Z	1
2	AB01 1355	Gear - 36Z	1
3	AX20 0103	Electrical Spring Clutch	1
4	A134 3237	Support Bracket - Clutch	1
5	AX20 0104	Electrical Spring Clutch	1
6	A134 3244	Bracket - Development Drive	1
7	AA14 5532	Drive Shaft	1
8	AB01 3888	Gear - 18Z	1
9	A134 3240	Relay Shaft	1
10	AA14 5530	Drive Shaft	1
11	AB01 7351	Timing Pulley - 30T	1
12	A134 3236	Support Bracket - Development Drive	1
13	A134 1105	Arm - Tightener	1
14	A134 1102	Belt Tension Bracket A'ssy	1
15	A134 1126	Bracket - Cleaning Drive	1
16	AB01 3871	Gear - 40Z	1
17	AB01 7340	Timing Pulley - 30/35/25Z	1
18	AA04 3365	Timing Belt - S3M318	1
19	A134 1114	Drum Holder	1
20	A134 2358	Drum Shaft	1
21	AA06 3380	Spring - 16mm	1
22	AA14 8418	Relay Shaft	1
23	A134 2278	Joint Gear - Cleaning	1
24	A134 1109	Tightner Bracket - Paper Feed	1
25	A134 5820	Bracket - Harness Clamp	1
26	AW02 0075	Photointerrupter	1
27	AX21 0046	Electrical Spring Clutch	1
28	AB01 3893	Gear - 29Z	1
29	AA04 3366	Timing Belt - S2M380	1
30	AB03 0169	Timing Pulley - 120Z	1
31	AA13 4092	Flange - Fly Wheel	1
32	A134 1135	Fly Wheel	2
33	AA06 2271	Release Spring	1
34	AA08 2047	Bushing - 8x16x7	3

Index No.	Part No.	Description	Q'ty Per Assembly
101	0720 0060E	Retaining Ring - M6	
102	0314 0120B	Philips Pan Head Screw - M4x12	
103	0434 0060B	Philips Tapping Screw - M4x6	
104	0740 3008	Ball Bearing - 8x22x7	
105	0802 5236	Tapping Screw - M4x8	
106	0414 0080B	Binding Self-tapping Screw - M4x8	
107	1105 0328	Harness Clamp - ES-0505	
108	0314 0100B	Philips Pan Head Screw - M4x10	
109	0720 0040E	Retaining Ring - M4	
110	0805 3480	Bushing - 6mm	
111	0951 4008B	Philips Screw With Washer - M4x8	
112	1105 0199	Clamp	
113	0725 0120W	Retaining Ring - M12	
114	0534 0040E	Hexagon Headless Set Screw - M4x4	

31. DRIVE SECTION 3 (A133)

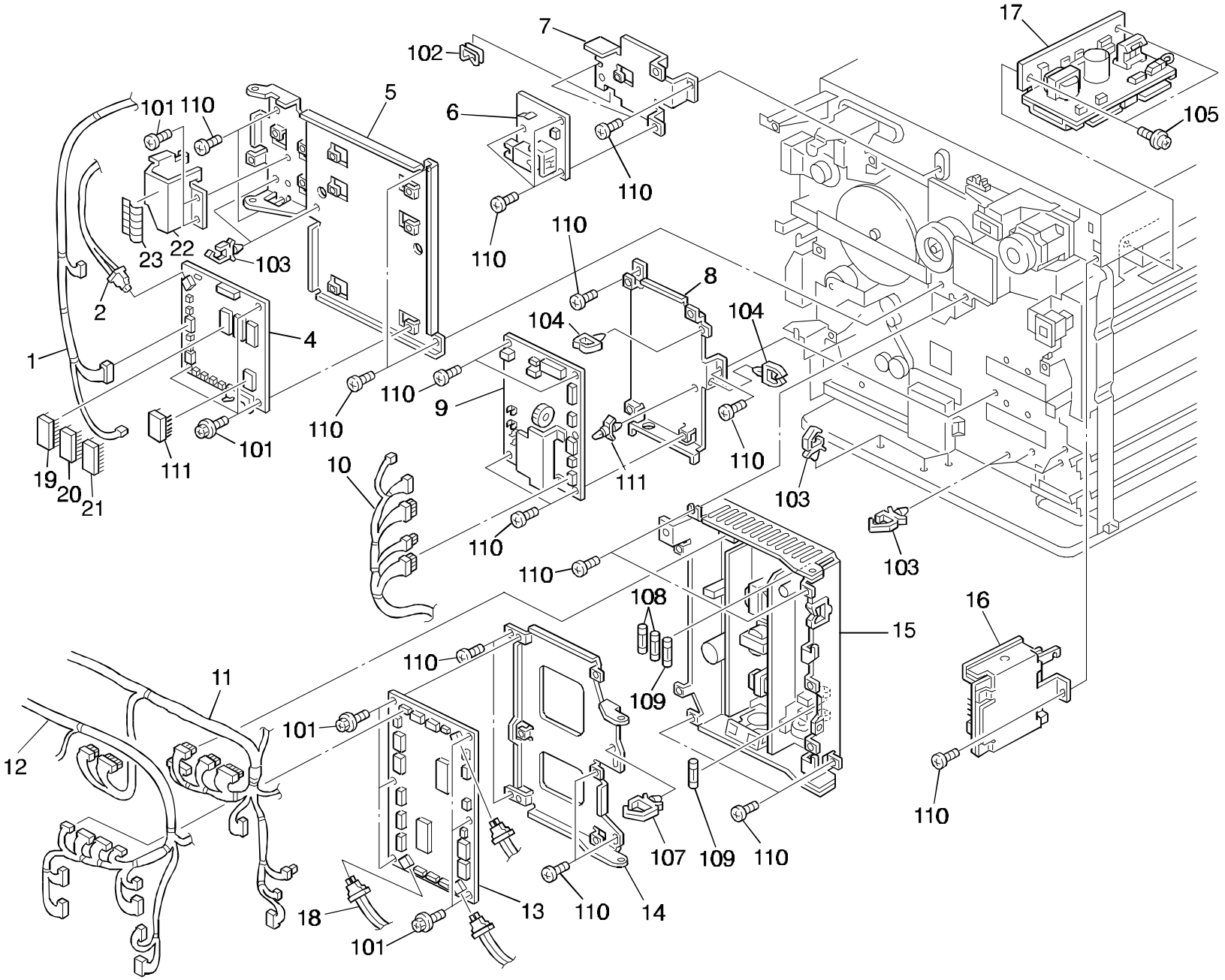


31. DRIVE SECTION 3 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AX20 0125	Magnetic Clutch - 0.35n.m - Z35	1
2	A133 7299	Stopper - Clutch	1
3	AB01 1170	Gear - 36Z	1
4	AB01 7377	Gear - 25Z	1
5	AB01 7335	Timing Pulley - 22Z/37Z	1
6	A134 2574	Flange - Gear	1
7	AB01 7333	Timing Pulley - 35/25Z	1
8	AA04 3364	Timing Belt - S3M300	1
9	AB03 0465	Timing Pulley - 25Z	1
10	A134 2572	Middle Tightener	1
11	AA06 0663	Spring - Tightener	1
12	AB03 0455	Tightener Pulley - 8x20x13	2
13	AB01 1153	Idle Gear - 25Z	1
14	AB01 1169	Gear - 28Z	1
15	A134 1109	Tightner Bracket - Paper Feed	1
16	AX20 0099	Magnetic Clutch - 7kgf.cm 26z	1
17	A134 2570	Stopper Bracket - Registration	1
18	A134 2579	Stopper Bracket	1
19	5053 0223	Bushing - 8mm	1
20	A134 2577	Upper Support Bracket - Paper Feed	1
21	A134 2575	Tightener Arm	1
22	AA06 0453	Relay Adjusting Spring	1
23	AB01 7336	Timing Pulley - 30Z/35Z	2
24	AX20 0098	Magnetic Clutch - 7kg Cm 35z	1
25	AB03 0464	Timing Pulley - 30Z	1
26	AA04 3368	Timing Belt - S3M609	1
27	AX20 0100	Magnetic Clutch - 3.5kgf Cm 35z	1
28	AB01 3875	Reverse Gear - 27Z	1
29	AX20 0126	Magnetic Clutch - 0.25n.m - Z42	1
30	AA13 2174	Spacer - M8	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0314 0060B	Philips Pan Head Screw - M4x6	
102	0434 0060B	Philips Tapping Screw - M4x6	
103	1105 0199	Clamp	
104	0720 0030E	Retaining Ring - M3	
105	0951 4006B	Philips Screw With Washer - M4x6	
106	0720 0040E	Retaining Ring - M4	
107	0720 0060E	Retaining Ring - M6	

32. ELECTRICAL SECTION 1 (A133)

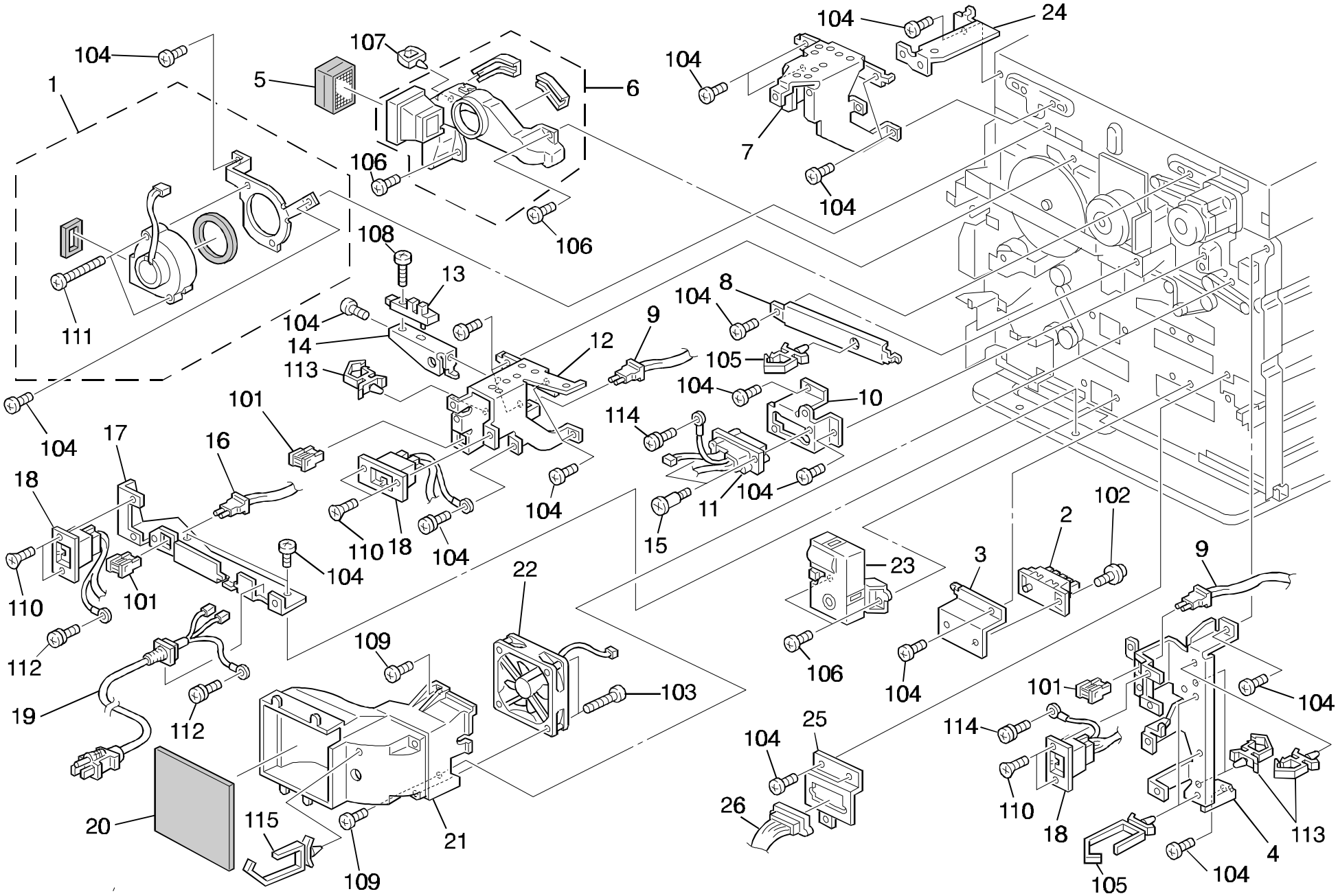


32. ELECTRICAL SECTION 1 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A133 7742	Harness - DC Main - Front	1
2	AW03 0052	Optics Fiber - 1300mm	1
4	A133 7714	SCU Board - 230V (NRG)	1
4	A133 7725	SCU Board - 230V (RIC/INF)	1
4	A133 7715	SCU Board (115V)	1
5	A134 5834	Bracket - SCU	1
6	AZ32 0073	Power Pack - Charge	1
7	A134 5829	Bracket - Charge Power Pack	1
8	A134 5813	Bracket - AC Drive Board	1
9	A133 7707	AC Drive Board (115V)	1
9	A133 7710	AC Drive Board - (230V)	1
10	A133 7737	AC Main Harness - 115V	1
10	A133 7744	AC Main Harness - 230V	1
11	A133 7736	Harness - DC Main	1
12	A133 7735	Harness - DC Main - Rear	1
12	A133 7742	Harness - DC Main - Front	1
13	A133 7726	BCU Board	1
14	A134 5831	Bracket - BCU	1
15	AZ24 0028	DC Supply Board (115V)	1
15	AZ24 0031	DC Supply Board (230V)	1
16	A134 1966	Drive Board - Scanne Motor	1
17	AZ23 0052	Lamp Stabilizer (115V)	1
17	AZ23 0062	Lamp Stabilizer (230V)	1
18	AW03 0051	Optics Fiber - 520mm	1
19	A614 5101	IC - UVEPROM 4M X16 150NS (NRG EU)	1
19	A133 7717	IC - UVEPROM 4M X16 150NS (LT)	1
20	A614 5102	IC - UVEPROM 4M X16 150NS (NRG EU)	1
20	A133 7720	IC - UVEPROM 4M X16 150NS (LT)	1
21	A614 5103	IC - UVEPROM 4M X16 150NS (NRG EU)	1
22	A133 7786	Grounding Plate Bracket - SCU (230V)	1
23	A133 7789	Spring Plate - SCU (230V)	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0443 0060B	Hexagon Tapping Screw - M3x6	
102	1105 0329	Clamp - ES-0510	
103	1105 0291	Wire Saddle	
104	1105 0199	Clamp	
105	0951 4006B	Philips Screw With Washer - M4x6	
106	1107 0554	Fuse (glass Case) - 17A - 125V	
107	1105 0292	Wire Saddle	
108	1107 0393	Fuse (glass Case) - 8A - 125V	
109	1107 0392	Fuse (glass Case) - 6.3A - 125V	
110	0434 0060B	Philips Tapping Screw - M4x6	
111	1407 4696	IC - M48T58Y-70PC1	

33. ELECTRICAL SECTION 2 (A133)

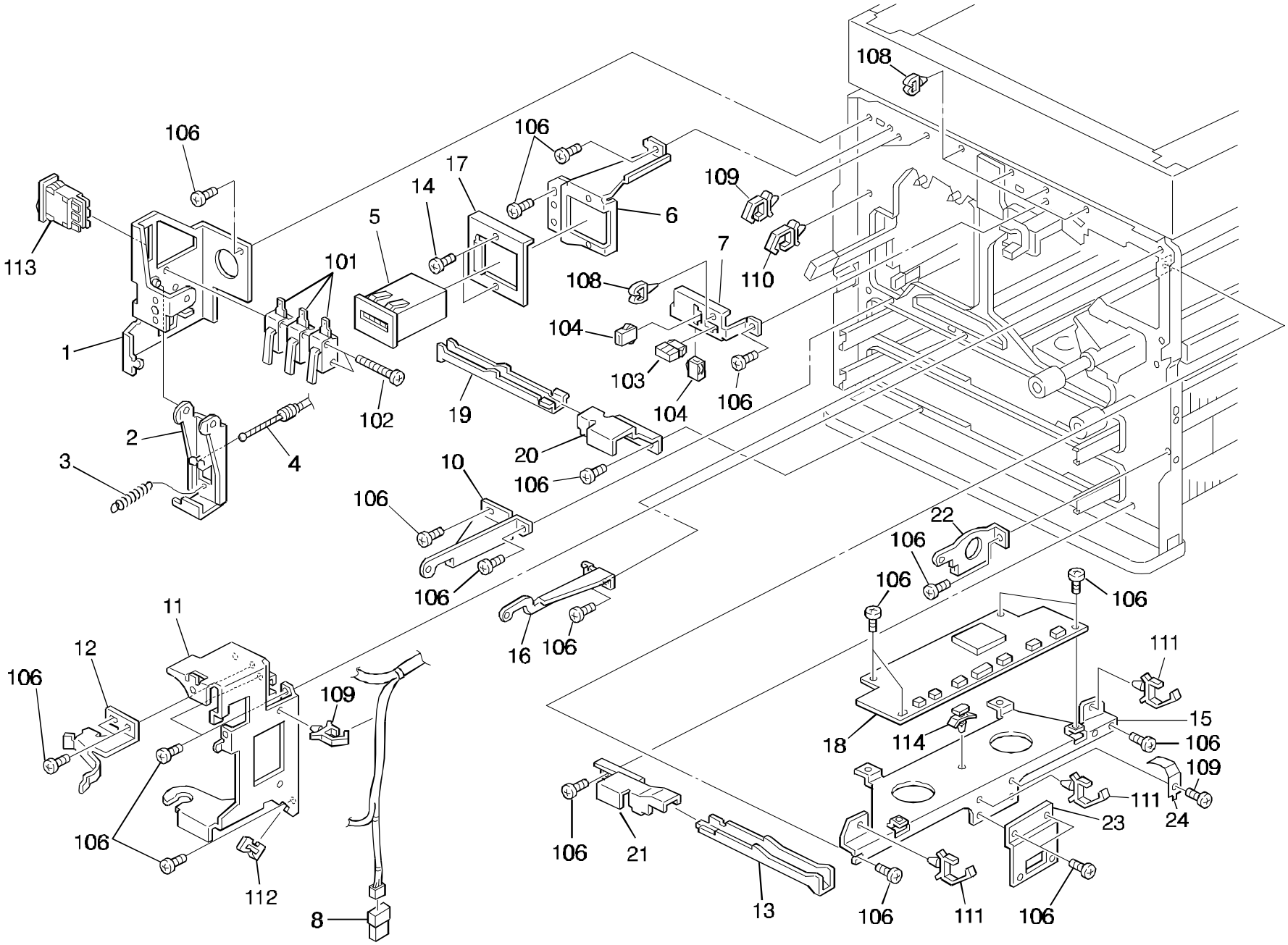


33. ELECTRICAL SECTION 2 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 1173	Exhaust Fan Motor-DC, 2.88W	1
2	AW50 0010	Push Switch	2
3	A134 2941	Bracket - Paper Sizesensor	2
4	A154 4618	Bracket - Socket	1
5	AA01 0083	Ozone Filter - 64x45x30	1
6	A130 1175	Main Corona Duct	1
7	A134 1099	Right Bracket - ADF	1
8	A134 5827	Short Bracket - Main Harness	1
9	AW03 0051	Optics Fiber - 520mm	1
10	A134 1065	Fusing Connector Bracket	1
11	A133 7737	AC Main Harness - 115V	1
11	A133 7744	AC Main Harness - 230V	1
12	A134 1096	Left Bracket - ADF	1
13	AW02 0022	Photointerruptor	1
14	A134 1098	Positioning Sensor Bracket	1
15	AA14 3301	Stepped Screw - M3x4	2
16	AW03 0053	Optics Fiber - 860mm	1
17	A134 5811	Bracket - Power Cord	1
18	A133 7736	Harness - DC Main	1
19	AZ00 0013	Power Supply Cord - (115V)	1
19	A153 5671	Power Supply Cord (230V)	1
20	AA01 2077	Dust Filter - Exhaust Fan	1
21	A134 1190	Exhaust Fan Duct	1
22	AX64 0054	Fan Motor - DC 2.4W	1
23	A134 2933	Tray Lift Motor - DC24V 0.5W	1
24	A134 1292	Bracket - Upper Cover	1
25	A154 4618	Bracket Socket	1
26	A134 5319	Harness - Duplex Unit	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	1102 4052	Optional Connector	
102	0443 0060B	Hexagon Tapping Screw - M3x6	
103	0414 0352B	Tapping Screw -M4x35	
104	0434 0060B	Philips Tapping Screw - M4x6	
105	1105 0316	Clamp	
106	0414 0060B	Tapping Screw - M4x6	
107	1105 0229	Clamp	
108	0434 0120B	Tapping Screw - M4x12	
109	0414 0080B	Binding Self-tapping Screw - M4x8	
110	0323 0060B	Philips Sunk Screw - M3x6	
111	0314 0350B	Philips Pan Head Screw - M4x35	
112	0950 4006M	Philips Screw With Flat Washer-M4x6	
113	1105 0292	Wire Saddle	
114	0801 0149	Philips Pan Head Screw - M4x6	
115	1105 0413	Harness Clamp	

34. ELECTRICAL SECTION 3 (A133)

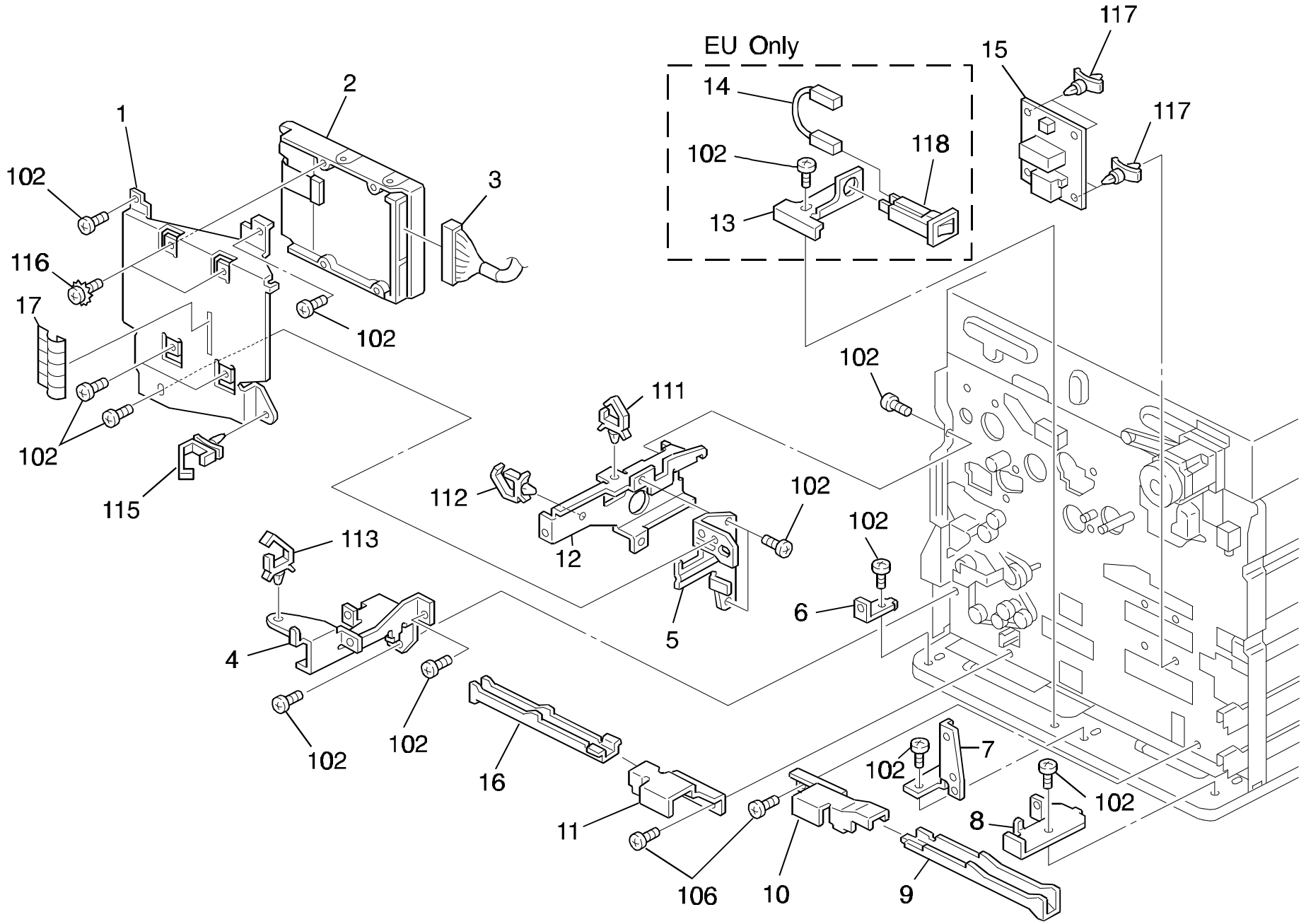


34. ELECTRICAL SECTION 3 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A133 7775	Bracket - Interlock Switch	1
2	A134 5823	Arm - Interlock Switch	1
3	5442 4467	Spring - Stripper Pawl Plate	1
4	AA05 1022	Drive Wire	1
5	AX31 0022	Total Counter	1
6	A134 5826	Bracket - Total Counter	1
7	A134 2344	Harness Bracket	1
8	5408 5160	Short Connector	1
9	AG07 0004	Magnetic Catch	1
10	A134 1318	Side Bracket - Front Cover	1
11	A134 3203	Shutter Bracket - Toner Holder	1
12	A134 3201	Cam - Toner Bottle	1
13	A133 7017	Right Grip Plate	1
14	5875 2088	Shoulder Screw - M4	2
15	A134 5824	Bracket - Power Pack	1
16	A134 1319	Middle Bracket - Front Cover	1
17	A133 7098	Total Caunter Cover	1
18	A134 5241	Power Pack	1
19	A134 1071	Left Grip Plate	1
20	A134 1072	Right Bracket - Grip Plate	1
21	A134 1073	Left Bracket - Grip Plate	1
22	A133 7097	Right Hinge Bracket	1
23	A133 7784	Power Pack Bracket	1
24	A133 7785	Spring Plate - Power Pack	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	1204 2355	Micro Switch - AM51632A531	
102	0313 0350B	Philips Pan Head Screw - M3x35	
103	1102 4559	Connector - 3p	
104	1102 6245	Connector - 2p	
105	1102 4473	Ct Connector - 2p	
106	0434 0060B	Philips Tapping Screw - M4x6	
107	0353 0300B	Bind Screw - M3x30	
108	1105 0199	Clamp	
109	1105 0310	Wire Clamp	
110	1105 0291	Wire Saddle	
111	1105 0292	Wire Saddle	
112	1105 0329	Clamp - ES-0510	
113	1204 2421	Main Switch	
114	1105 0367	Spacer	

35. ELECTRICAL SECTION 4 (A133)

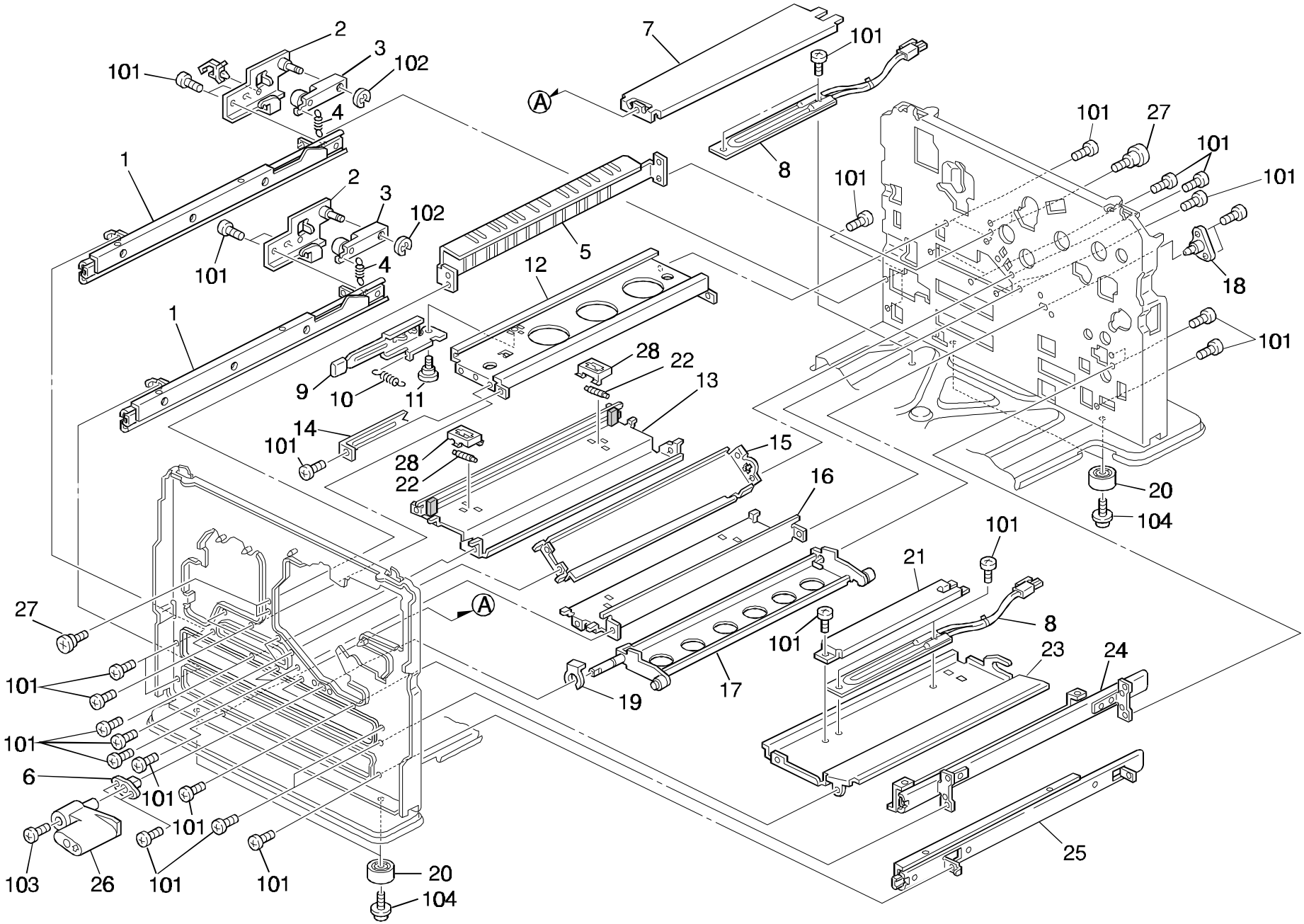


35. ELECTRICAL SECTION 4 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A133 7883	Bracket - HDD	1
2	A133 7884	HDD - 1G - SCSI	1
3	A133 7920	HDD Harness	1
4	A134 5833	Lower Bracket - SCU	1
5	A134 5834	Bracket - SCU	1
6	A134 1345	Rear Cover Bracket	1
7	A134 5818	Left Lower Bracket - DC Supply	1
8	A134 5817	Right Lower Bracket - DC Supply	1
9	A134 1071	Left Grip Plate	1
10	A134 1073	Left Bracket - Grip Plate	1
11	A134 1072	Right Bracket - Grip Plate	1
12	A133 7099	Braclet - Rear Cover	1
13	A133 7781	Bracket - Circuit Breaker (230V)	1
14	A133 7760	Relay Harness - Circuit Breaker (230V)	1
15	A133 7705	Relay Board	1
16	A133 7017	Right Grip Plate	1
17	A133 7788	Spring Plate - HDD	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	1105 0329	Clamp - ES-0510	
102	0434 0060B	Philips Tapping Screw - M4x6	
103	0742 3808M	Bushing - 8x16x5	
104	0720 0060E	Retaining Ring - M6	
105	0720 0040E	Retaining Ring - M4	
106	0443 0060B	Hexagon Tapping Screw - M3x6	
107	0805 3386	Bushing - 8mm	
108	0443 0140B	Tapping Screw - M3x14	
109	0805 3492	Bushing - 8x16x5	
110	1105 0087	Clamp	
111	1105 0316	Clamp	
112	1105 0292	Wire Saddle	
113	1105 0291	Wire Saddle	
114	0960 3004B	Screw - M3x4	
115	1105 0310	Wire Clamp	
116	0801 0153	Bind Screw - M6	
117	1105 0193	Nylon Stud	
118	1107 0472	Circuit Breaker - 250V/8A	

36. FRAME SECTION 1 (A133)

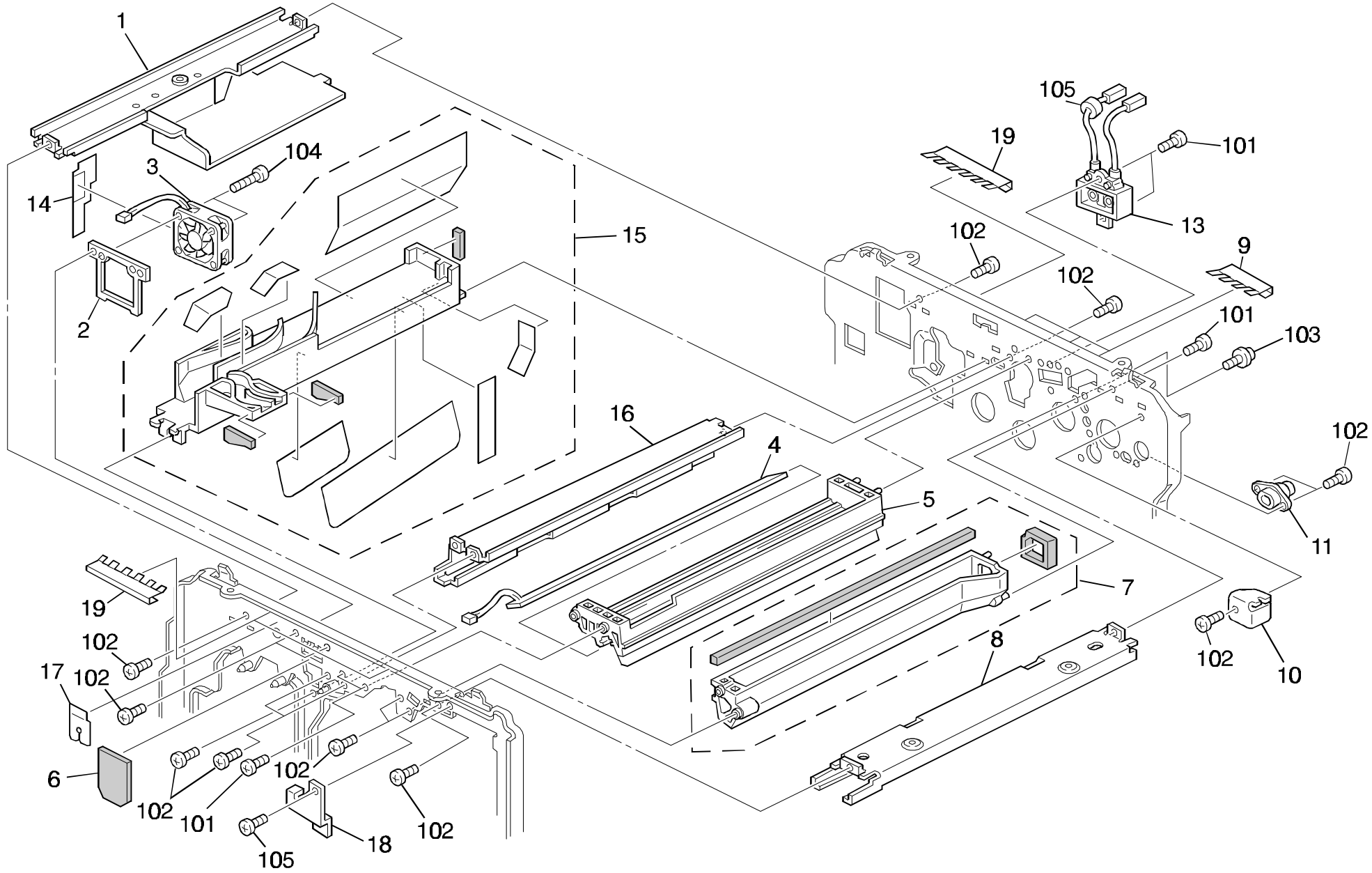


36. FRAME SECTION 1 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 2921	Left Slide Rail	2
2	A134 2926	Paper Feed Lock Bracket	2
3	A096 6266	Tray Lock Arm	2
4	AA06 0534	Tray Lock Spring - 19mm	2
5	A134 3975	Paper Guide Stay	1
6	AA08 2064	Bushing - 10mm	1
7	A134 2947	Heater Cover	1
8	AX40 0066	Heater - 120V 9W	2
8	AX40 0067	Heater - 230V 9W	2
9	A134 4352	Fusing Lock Lever	1
10	5442 4467	Spring - Stripper Pawl Plate	1
11	5203 1686	Screw - Slid Rail	1
12	A134 4351	Stay - Fusing Rail	1
13	A134 2375	Left Stay - Collection Bottle	1
14	A134 4355	Fusing Unit Stopper	1
15	A134 1081	Transfer Unit Stay	1
16	A134 2374	Right Stay - Collection Bottle	1
17	A134 3980	Stay - Transfer Unit Handle	1
18	A134 1063	Transfer Unit Bracket	1
19	5215 2621	Snap Ring - M6	1
20	AH01 0007	Rubber Foot	4
21	A134 1084	Drum Heater Cover	1
22	A060 3826	Toner Collection Bottle Roller	2
23	A134 1083	Paper Feed Stay	1
24	A134 4901	Duplex Right Rail	1
25	A134 2930	Right Slide Rail	1
26	AG05 1113	Handle - Transfer Unit	1
27	AA14 3724	Stepped Screw	4
28	A060 3827	Roller Holder	2

Index No.	Part No.	Description	Q'ty Per Assembly
101	0434 0060B	Philips Tapping Screw - M4x6	
102	0720 0040E	Retaining Ring - M4	
103	0414 0080B	Binding Self-tapping Screw - M4x8	
104	0960 4010B	Philips Flange Screw - M4 X 10	

37. FRAME SECTION 2 (A133)

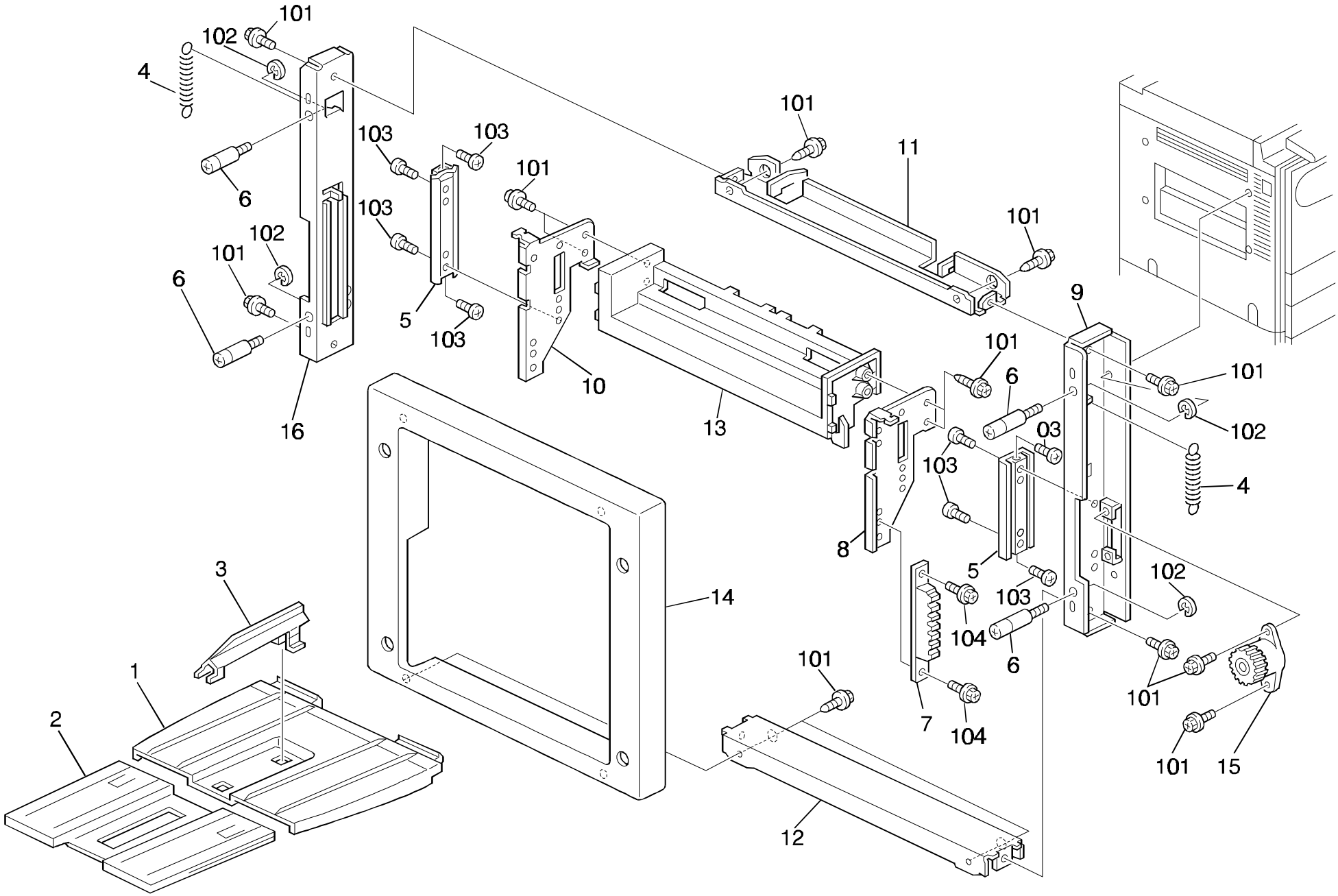


37. FRAME SECTION 2 (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A134 1076	Left Stay - Exposure Unit	1
2	A134 1164	Cooling Fan Bracket	1
3	AX64 0053	Fan Motor - DC 1.44W	1
4	AX50 0051	Quenching Lamp	1
5	A134 2332	Absorb Duct	1
6	AA01 2078	Dust Filter - Vacuum Fan	1
7	A134 2334	Middle Exhaust Duct	1
8	A134 1080	Right Stay - Exposure Unit	1
9	A133 7008	Grounding Plate - Large	3
10	A134 5825	Rear Bracket - Power Pack	1
11	A134 3227	Positioning Holder - Development	1
13	AD02 1109	Receptacle - Charger	1
14	A134 1192	Seal - Fan Motor	1
15	A134 1161	Cooling Fan Duct	1
16	A134 2346	Drum Guide Stay - Left	1
17	A134 1195	Seal - Fan Harness	1
18	A134 3229	Stopper - Development Unit	1
19	A133 7009	Grounding Plate - Small	3

Index No.	Part No.	Description	Q'ty Per Assembly
101	0414 0060B	Tapping Screw - M4x6	
102	0434 0060B	Philips Tapping Screw - M4x6	
103	0951 4006B	Philips Screw With Washer - M4x6	
104	0353 0300B	Bind Screw - M3x30	
105	1607 0903	Ferrite Core : HF70RH16x28x10 (230V)	

38. 500 COPY TRAY (A615)



38. 500 COPY TRAY (A615)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AF04 3069	Copy Tray	1
2	AF04 3076	Copy Tray Slide	1
3	AF04 3077	Copy Tray Guide	1
4	AA06 0666	Tenshion Spring : 12N	1
5	AA07 0034	Slide Rail	1
6	AA14 3737	Srepped Screw	1
7	AB01 5013	Rack	1
8	A615 4453	Side Plate : Risning Tray : Front	1
9	A615 4455	Bracket : Paper Ext Sup	1
10	A615 4463	Rear Side Plate - Copy Tray Holder	1
11	A615 4472	Upper Stay	1
12	A615 4473	Lower Stay	1
13	A615 4474	Copy Tray Holder	1
14	A615 4480	Cover - Copy Tray	1
15	A615 4457	Oil Dumper - 0.05 NFM	1
16	A615 4465	Rear Side Plate	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	0451 4006B	Tapping Screw - 4x6	1
102	0720 0040E	Retaining Ring - M4	1
103	0313 0050B	Philips Pan Head Screw - M3x5	1
104	0802 5236	Tapping Screw - M4x8	1

39. SCU BOARD (A133)

CAPACITOR

SYMBOL NO.	INDEX NO.
C401	160
C402	160
C403	133
C404	133
C405	133
C406	133
C407	134
C408	134
C409	134
C410	133

SYMBOL NO.	INDEX NO.
C411	133
C412	133
C413	133
C414	133
C415	134
C416	133
C417	133
C418	133
C419	132
C420	132

SYMBOL NO.	INDEX NO.
C421	133
C422	133
C423	133
C424	133
C425	133
C426	134
C427	136
C428	130
C429	133
C430	135

SYMBOL NO.	INDEX NO.
C431	133
C432	133
C433	133
C434	133
C435	133
C436	133
C437	133
C438	133
C439	133
C440	133

SYMBOL NO.	INDEX NO.
C441	133
C442	133
C443	131
C444	133
C445	133
C446	-----
C447	-----
C448	135
C449	135
C450	135

SYMBOL NO.	INDEX NO.
C451	135
C452	135
C453	135
C454	135
C455	135
C456	135
C457	135
C458	135
C459	135
C460	135

SYMBOL NO.	INDEX NO.
C461	135
C462	-----
C463	135
C464	135
C465	134
C466	134
C467	134
C468	134

CONNECTOR

SYMBOL NO.	INDEX NO.
CN401	109
CN402	104
CN403	102
CN404	110
CN405	114
CN406	107
CN407	113
CN408	105
CN409	112
CN410	111

SYMBOL NO.	INDEX NO.
CN411	-----
CN412	-----
CN413	108
CN414	103
CN415	106

DPS

SYMBOL NO.	INDEX NO.
DPS401	117

FIB

SYMBOL NO.	INDEX NO.
FIB401	137
FIB402	137
FIB403	-----
FIB404	137
FIB405	138
FIB406	138
FIB407	137

FL

SYMBOL NO.	INDEX NO.
FL401	129
FL402	139
FL403	139
FL404	139
FL405	139
FL406	139
FL407	139
FL408	139
FL409	139
FL410	139

SYMBOL NO.	INDEX NO.
FL411	139
FL412	139

LED

SYMBOL NO.	INDEX NO.
LED401	119

IC

SYMBOL NO.	INDEX NO.
IC401	126
IC402	125
IC403	121
IC404	-----
IC405	120
IC406	124
(SOCKET)	116
IC407	
IC408	123
IC409	123

SYMBOL NO.	INDEX NO.
IC410	122
IC411 (SOCKET)	115
IC412 (SOCKET)	115
IC413 (SOCKET)	115

OSC

SYMBOL NO.	INDEX NO.
OSC401	128
OSC402	127

RESISTOR

SYMBOL NO.	INDEX NO.
R401	153
R402	149
R403	157
R404	152
R405	145
R406	155
R407	144
R408	155
R409	144
R410	144

SYMBOL NO.	INDEX NO.
R411	144
R412	144
R413	144
R414	144
R415	144
R416	141
R417	141
R418	141
R419	141
R420	141

SYMBOL NO.	INDEX NO.
R421	141
R422	141
R423	141
R424	145
R425	145
R426	148
R427	143
R428	143
R429	154
R430	145

SYMBOL NO.	INDEX NO.
R431	145
R432	154
R433	144
R434	158
R435	159
R436	153
R437	153
R438	153
R439	153
R440	

SYMBOL NO.	INDEX NO.
R441	153
R442	153
R443	153
R444	153
R445	153
R446	153
R447	153
R448	153
R449	153
R450	153

SYMBOL NO.	INDEX NO.
R451	153
R452	144
R453	145
R454	146
R455	157
R456	152
R457	145
R458	145
R459	145
R460	145

SYMBOL NO.	INDEX NO.
R461	145
R462	151
R463	147
R464	144
R465	145
R466	145
R467	145
R468	145
R469	145
R470	145

SYMBOL NO.	INDEX NO.
R471	145
R472	145
R473	145
R474	145
R475	150
R476	145
R477	149
R478	157
R479	150
R480	153

SYMBOL NO.	INDEX NO.
R481	153
R482	153
R483	145
R484	150
R485	150
R486	145
R487	145
R488	150
R489	150
R490	156

SYMBOL NO.	INDEX NO.
R491	150
R492	150
R493	150
R494	150
R495	150
R496	150
R497	150
R498	150
R499	150
R500	150

SYMBOL NO.	INDEX NO.
R501	150
R502	150
R503	150
R504	150
R505	150
R506	150
R507	150
R508	150
R509	150
R510	150

SYMBOL NO.	INDEX NO.
R511	150
R512	150
R513	150
R514	150
R515	150
R516	150
R517	150
R518	142
R519	150
R520	150

SYMBOL NO.	INDEX NO.
R521	153
R522	153

TP

SYMBOL NO.	INDEX NO.
TP402	101

ZD

SYMBOL NO.	INDEX NO.
ZD401	118

39. SCU BOARD (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
*	A133 7714	SCU Board - 230V (NRG)	1
*	A133 7725	SCU Board - 230V (RIC/INF)	1
*	A133 7715	SCU Board (115V)	1
1	A134 5119	IC - TC160G22AF-1024 (NRG)	1
1	A133 7723	IC - TC160G22AF-1024 (LT)	1
2	A614 5101	IC - UVEPROM 4MX16 150NS (NRG)	1
2	A133 7717	IC - UVEPROM 4MX16 150NS (LT)	1
3	A614 5102	IC - UVEPROM 4MX16 150NS (NRG)	1
3	A133 7720	IC - UVEPROM 4MX16 150NS (LT)	1
4	A614 5103	IC - UVEPROM 4MX16 150NS	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	1101 0328	Connector Pin Contact	
102	1102 4201	Connector - 2p	
103	1102 4202	Connector - 3p	
104	1102 4203	CT Header - 4p	
105	1102 4204	CT Header - 5p	
106	1102 4621	CT Header - 4p	
107	1102 4631	CT Connector - 2p	
108	1102 5276	Connector - 4p	
109	1102 5311	Connector - 6p	
110	1102 5409	Connector - 20p	
111	1102 5718	Optical Fiber Connector	
112	1102 6295	Connector - 2p	
113	1102 6559	Connector - 60p	
114	1103 1317	Connector	
115	1104 0376	IC Socket - 40p - DICF-40CS-E	
116	1104 0377	IC Socket - 28p	
117	1204 1570	Dip Switch	
118	1402 0688	Diode	
119	1403 0308	LED - RED - TLR102A	
120	1407 2344	IC - TD62382F	
121	1407 4145	IC - HD74LS07PF	
122	1407 4209	IC - MC68340FE16C	
123	1407 4336	PSRAM	
124	1407 4696	IC - M48T58Y-70PC1	
125	1408 0611	IC - 3771	
126	1408 0874	Transistor Array - M54587FP	
127	1503 0095	Oscillator - P3 32.768khz	
128	1503 0518	Oscillator - CSA4.91mgg	
129	1602 0918	Filter - 270pf - Emi	
130	1605 0223	Capacitor - 20pF 50V	
131	1605 0322	Capacitor - 47pF 50V	
132	1605 0343	Capacitor - 30pF ±5% 50V	
133	1605 0636	Capacitor - 0.1µF	
134	1606 1139	Capacitor - 0.01µF ±20%	
135	1606 1208	Capacitor - 100pF ±5% 50V	

Index No.	Part No.	Description	Q'ty Per Assembly
136	1606 1450	Capacitor - 10pF 50V	
137	1607 0477	Coil - BLM21A121SPB	
138	1607 0551	Inductor - BLM32A07PB	
139	1607 0705	Noize filter - ACF51832-470	
140	1630 1121	Resistor - 120Ω±5% 1/8W	
141	1630 1161	Resistor - 160 Ω ±5% 1/8W	
142	1630 2100	Resistor - 10Ω 1/8W ±5%	
143	1630 2101	Resistor - 100Ω 1/8W	
144	1630 2102	Resistor - 1K Ω 1/8W ±5%	
145	1630 2103	Resistor - 10K Ω 1/8W	
146	1630 2106	Resistor - 10MΩ -1/8W	
147	1630 2206	Resistor - 20M Ω 1/8W ±5%	
148	1630 2221	Resistor - 220 Ω	
149	1630 2222	Resistor - 2.2K Ω 1/8W	
150	1630 2330	Resistor - 33Ω 1/8W ±5%	
151	1630 2334	Resistor - 330k Ω	
152	1630 2471	Resistor - 470Ω 1/8W ±5%	
153	1630 2472	Resistor - 4.7k Ω 1/8W ±5%	
154	1630 2473	Resistor - 47kΩ 1/8W ±5%	
155	1630 2511	Resistor - 510Ω 1/8W ±5%	
156	1630 2680	Resistor - 68Ω 1/8W ±5%	
157	1630 2681	Resistor - 680Ω 1/8W ±5%	
158	1632 1002	Resistor - 10.0kΩ1/8W±1%	
159	1632 3481	Resistor - 3.48k Ω ±1% 1/8W	
160	1640 5101	Capacitor - 100µF ±20% 50V	

Index No.	Part No.	Description	Q'ty Per Assembly

40. BCU BOARD (A133)

CAPACITOR

SYMBOL NO.	INDEX NO.
C201	186
C202	186
C203	187
C204	151
C205	156
C206	156
C207	156
C208	153
C209	151
C210	156

SYMBOL NO.	INDEX NO.
C211	151
C212	154
C213	154
C214	151
C215	151
C216	151
C217	-----
C218	150
C219	151
C220	151

SYMBOL NO.	INDEX NO.
C221	151
C222	151
C223	151
C224	151
C225	151
C226	155
C227	149
C228	151
C229	156
C230	149

SYMBOL NO.	INDEX NO.
C231	155
C232	151
C233	151
C234	151
C235	151
C236	151
C237	151
C238	151
C239	151
C240	156

SYMBOL NO.	INDEX NO.
C241	156
C242	156
C243	151
C244	151
C245	151
C246	151
C247	151
C248	151
C249	151
C250	151

SYMBOL NO.	INDEX NO.
C251	151
C252	151
C253	151
C254	151
C255	151
C256	151
C257	151
C258	151
C259	151
C260	151

SYMBOL NO.	INDEX NO.
C261	151
C262	151
C263	154
C264	156
C265	151
C266	152
C267	152
C268	153
C269	153
C270	153

SYMBOL NO.	INDEX NO.
C271	151
C272	153
C273	151
C274	151
C275	151
C276	151
C277	156
C278	156
C279	156
C280	151

SYMBOL NO.	INDEX NO.
C281	156
C282	151
C283	151
C284	151
C285	156
C286	156
C287	156
C288	156
C289	156
C290	153

SYMBOL NO.	INDEX NO.
C291	156
C292	154
C293	154
C294	154
C295	154
C296	154
C297	154
C298	154
C299	154
C300	154

SYMBOL NO.	INDEX NO.
C301	154
C302	154
C303	154
C304	154
C305	154
C306	154
C307	147
C308	147
C309	154
C310	154

SYMBOL NO.	INDEX NO.
C311	154
C312	154
C313	154
C314	151
C315	148
C316	148
C317	148
C318	148
C319	148
C320	148

SYMBOL NO.	INDEX NO.
C321	148
C322	148
C323	148
C324	148
C325	148
C326	148
C327	148
C328	148
C329	148
C330	148

SYMBOL NO.	INDEX NO.
C331	148
C332	148
C333	148
C334	148
C335	148
C336	156
C337	148
C338	156
C339	148
C340	156

40. BCU BOARD (A133)

CAPACITOR

SYMBOL NO.	INDEX NO.
C341	148
C342	156
C343	148
C344	156
C345	148
C346	148
C347	-----
C348	-----
C349	-----
C350	-----

CONNECTOR

SYMBOL NO.	INDEX NO.
CN201	117
CN202	-----
CN203	105
CN204	-----
CN205	111
CN206	104
CN207	103
CN208	-----
CN209	108
CN210	113
CN211	115
CN212	-----
CN213	114
CN214	115
CN215	105
CN216	107
CN217	106
CN218	112
CN219	116
CN220	116
CN221	116
CN222	109
CN223	102
CN299	110

DIODE

SYMBOL NO.	INDEX NO.
D201	122
D202	122
D203	123
D204	122
D205	123

DPS

SYMBOL NO.	INDEX NO.
DPS201	119

FL

SYMBOL NO.	INDEX NO.
FL201	158

IC

SYMBOL NO.	INDEX NO.
IC201	139
IC202 (SOCKET)	118
IC203	127
IC204	127
IC205	127
IC206	135
IC207	133
IC208	188
IC209	125
IC210	128
IC211	129
IC212	
IC213	
IC214	129
IC215	136
IC216	129
IC217	134
IC218	131
IC219	127
IC220	126
IC221	130
IC222	137
IC223	-----
IC224	137
IC225	138
IC226	132
IC227	125
IC228	188

L

SYMBOL NO.	INDEX NO.
L201	157
L202	157
L203	157
L204	157
L205	157

LED

SYMBOL NO.	INDEX NO.
LED201	124
LED202	124

OSC

SYMBOL NO.	INDEX NO.
OSC201	140
OSC202	141
OSC203	142

Q

SYMBOL NO.	INDEX NO.
Q201	120

RAY

SYMBOL NO.	INDEX NO.
RAY201	145
RAY202	146
RAY203	145
RAY204	143
RAY205	143
RAY206	145
RAY207	146
RAY208	143
RAY209	145
RAY210	
RAY211	146

RESISTOR

SYMBOL NO.	INDEX NO.
R201	176
R202	163
R203	170
R204	164
R205	160
R206	160
R207	160
R208	161
R209	164
R210	164

SYMBOL NO.	INDEX NO.
R211	164
R212	170
R213	164
R214	164
R215	164
R216	172
R217	172
R218	164
R219	164
R220	164

SYMBOL NO.	INDEX NO.
R221	163
R222	180
R223	164
R224	164
R225	164
R226	164
R227	164
R228	164
R229	164
R230	164

SYMBOL NO.	INDEX NO.
R231	173
R232	164
R233	168
R234	174
R235	164
R236	164
R237	164
R238	164
R239	164
R240	165

SYMBOL NO.	INDEX NO.
R241	176
R242	164
R243	164
R244	164
R245	164
R246	164
R247	164
R248	164
R249	164
R250	163

SYMBOL NO.	INDEX NO.
R251	164
R252	164
R253	164
R254	164
R255	164
R256	164
R257	164
R258	164
R259	164
R260	164

SYMBOL NO.	INDEX NO.
R261	164
R262	164
R263	164
R264	164
R265	164
R266	164
R267	164
R268	164
R269	164
R270	180

SYMBOL NO.	INDEX NO.
R271	173
R272	164
R273	164
R274	164
R275	163
R276	164
R277	164
R278	179
R279	162
R280	164

SYMBOL NO.	INDEX NO.
R281	164
R282	164
R283	163
R284	163
R285	163
R286	164
R287	164
R288	178
R289	163
R290	164

SYMBOL NO.	INDEX NO.
R291	164
R292	164
R293	164
R294	164
R295	163
R296	164
R297	164
R298	164
R299	177
R300	164

SYMBOL NO.	INDEX NO.
R301	164
R302	185
R303	182
R304	173
R305	177
R306	167
R307	167
R308	177
R309	171
R310	171

SYMBOL NO.	INDEX NO.
R311	163
R312	164
R313	164
R314	169
R315	169
R316	163
R317	178
R318	164
R319	163
R320	164

SYMBOL NO.	INDEX NO.
R321	164
R322	163
R323	164
R324	164
R325	166
R326	175
R327	164
R328	184
R329	183
R330	173

SYMBOL NO.	INDEX NO.
R331	173
R332	183
R333	164
R334	163
R335	163
R336	163
R337	163
R338	-----
R339	164
R340	178

40. BCU BOARD (A133)

RESISTOR

SYMBOL NO.	INDEX NO.
R341	163
R342	178
R343	163
R344	181
R345	164
R346	178
R347	163
R348	159
R349	170
R350	172

SYMBOL NO.	INDEX NO.
R351	172
R352	172
R353	172
R354	189
R355	172
R356	172
R357	172
R358	177
R359	164
R360	164

SYMBOL NO.	INDEX NO.
R361	164
R362	164
R363	164
R364	164
R365	164
R366	164
R367	164
R368	164
R369	164
R370	164

SYMBOL NO.	INDEX NO.
R371	172
R372	172
R373	172
R374	172
R375	172
R376	172
R377	172
R378	164
R379	164
R380	172

SYMBOL NO.	INDEX NO.
R381	172
R382	172
R383	172
R384	172
R385	172
R386	172
R387	172
R388	172
R389	172
R390	164

SYMBOL NO.	INDEX NO.
R391	164
R392	164
R393	172
R394	172
R395	172

TP

SYMBOL NO.	INDEX NO.
TP208	101

ZD

SYMBOL NO.	INDEX NO.
ZD201	121

40. BCU BOARD (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
*	A133 7726	BCU Board	1
1	A133 5104	IC - UVEPROM 4MX16 150NS	1
2	A134 5127	IC - HD6433278A44P10	1
3	A134 5109	IC - JSL38G519ANO5	1

Index No.	Part No.	Description	Q'ty Per Assembly
101	1101 0328	Connector Pin Contact	
102	1102 4202	Connector - 3p	
103	1102 4203	CT Header - 4p	
104	1102 4205	CT Header- 6p	
105	1102 4207	Connector - 8p	
106	1102 4208	Connector - 9p	
107	1102 4211	CT Header - 12p	
108	1102 4497	Connector - 13p	
109	1102 4621	CT Header - 4p	
110	1102 4626	Connector - 9p	
111	1102 4644	Connector - 9p	
112	1102 5007	CT Header - 14p	
113	1102 5409	CT Header - 20p	
114	1102 5410	Connector - 22p	
115	1102 5413	Connector - 28p	
116	1102 5718	Optical Fiber Connector	
117	1102 6600	Connector - 8p	
118	1104 0376	IC Socket - 40p - DICF-40CS-E	
119	1204 1537	Dip Switch	
120	1400 0558	Transistor - 2SD780	
121	1402 0688	Diode	
122	1402 1122	Diode - MA159A	
123	1402 1191	Diode - 400V 1A	
124	1403 0308	LED - Red - TLR102A	
125	1407 1596	TTLIC - SN74LS14NS	
126	1407 1598	TTLIC - SN74LS125ANS	
127	1407 2187	TTLIC - SN74LS07NS	
128	1407 2218	TTLIC - SN74LS06NS	
129	1407 2231	IC - TD62308AF	
130	1407 2261	IC - NJM2902M	
131	1407 3285	IC - TC74HC08AF	
132	1407 3380	HS-C2MOS - TC74HCT04AF	
133	1407 4209	IC - MC68340FE16C	
134	1407 4315	IC - TE7751	
135	1408 0598	IC - MB3773PF	

Index No.	Part No.	Description	Q'ty Per Assembly
136	1408 0770	IC - L293D	
137	1408 0874	Transistor Array - M54587FP	
138	1408 0877	Comparator - LM339NS	
139	1408 1085	IC - UDN2544B	
140	1503 0460	Ocsilator - 32.768kHZ	
141	1503 0504	Ocsilator - TQC-246C-6R-3.6864M	
142	1503 0569	Ocsilator - 19.66MHZ	
143	1601 7738	Resistor - 10 Ω x8 5%	
144	1601 7739	Resistor - 4.7k Ω x2 5%	
145	1601 7740	Resistor - 4.7k Ω -5% 1/32W	
146	1601 7741	Resistor - 4.7k Ω -5% 1/32W	
147	1604 2585	Capacitor - 4.7µF	
148	1605 0219	Capacitor - 1000pF 50V +80% -20%	
149	1605 0223	Capacitor - 20pF 50V	
150	1605 0322	Capacitor - 47pF 50V	
151	1605 0636	Capacitor - 0.1µF	
152	1606 1133	Capacitor - 22pF - 50V	
153	1606 1135	Capacitor - 470pF 50V	
154	1606 1208	Capacitor - 100pF ±5% 50V	
155	1606 1450	Capacitor - 10pF 50V	
156	1606 1452	Capacitor - 0.01µF 50V	
157	1607 0551	Inductor - BLM32A07PB	
158	1607 0796	Noize Filter - ACF51832-470	
159	1630 1101	Resistor - 100 Ω 1/4W ±5%	
160	1630 1121	Resistor - 120Ω±5% 1/8W	
161	1630 1161	Resistor - 160 Ω ±5% 1/8W	
162	1630 1222	Resistor - 2.2k Ω ±5% 1/8W	
163	1630 2102	Resistor - 1k Ω 1/8W ±5%	
164	1630 2103	Resistor - 10k Ω 1/8W	
165	1630 2106	Resistor - 10MΩ -1/8W	
166	1630 2152	Resistor - 1.5k Ω 1/8W ±5%	
167	1630 2204	Resistor - 200k Ω ±5% 1/8W	
168	1630 2206	Resistor - 20M Ω 1/8W ±5%	
169	1630 2221	Resistor - 220 Ω	

Index No.	Part No.	Description	Q'ty Per Assembly
170	1630 2222	Resistor - 2.2k Ω 1/8W	
171	1630 2243	Resistor - 24k Ω 1/8W ±5%	
172	1630 2330	Resistor - 33Ω 1/8W ±5%	
173	1630 2332	Resistor - 3.3k Ω 1/8W ±5%	
174	1630 2334	Resistor - 330k Ω	
175	1630 2362	Resistor - 3.6k Ω 1/8W ±5%	
176	1630 2471	Resistor - 470Ω 1/8W ±5%	
177	1630 2472	Resistor - 4.7k Ω 1/8W ±5%	
178	1630 2511	Resistor - 510Ω 1/8W ±5%	
179	1630 2561	Resistor - 560 Ω ±5% 1/8W	
180	1630 2680	Resistor - 68Ω 1/8W ±5%	
181	1630 2821	Resistor - 820 Ω 1/8W ±5%	
182	1632 4641	Resistor - 4.64k Ω ±1% 1/8W	
183	1632 5231	Resistor - 5.23k Ω ±1%	
184	1632 5360	Resistor - 536 Ω ±1% 1/8W	
185	1632 5621	Resistor - 5.62k Ω ±1% 1/8W	
186	1640 5101	Capacitor - 100µF ±20% 50V	
187	1640 5338	Capacitor - 0.33µF ±20% 50V	
188	1902 0012	IC - SRAM - 64k X8 100NS 01	
189	1630 2750	Resistor - 75 Ω 1/8W ±5%	

41. IPU BOARD (A133)

AR

SYMBOL NO.	INDEX NO.
AR2	161
AR10	161
AR11	161
AR12	161
AR13	161
AR15	161
AR18	161
AR19	161
AR20	161
AR21	161
AR22	161

SYMBOL NO.	INDEX NO.
AR23	161
AR24	161
AR29	162
AR30	162
AR31	162
AR32	162
AR33	162
AR34	163
AR35	163
AR36	162
AR37	162

SYMBOL NO.	INDEX NO.
AR38	162
AR39	162
AR40	162
AR41	162
AR42	162
AR43	162
AR44	162
AR45	162
AR46	162
AR47	163
AR48	163

BAT

SYMBOL NO.	INDEX NO.
BAT1	117

CAPACITOR

SYMBOL NO.	INDEX NO.
C1	238
C2	234
C3	253
C4	245
C5	245
C6	245
C7	241
C8	245
C9	234
C10	234

SYMBOL NO.	INDEX NO.
C11	234
C12	236
C13	245
C14	241
C15	245
C16	242
C17	241
C18	241
C19	245
C20	253

SYMBOL NO.	INDEX NO.
C21	245
C22	246
C23	253
C24	253
C25	237
C26	253
C27	238
C28	239
C29	253
C30	243

CAPACITOR

SYMBOL NO.	INDEX NO.
C31	244
C32	240
C33	253
C34	239
C35	235
C36	235
C37	244
C38	169
C39	253
C40	169

SYMBOL NO.	INDEX NO.
C41	169
C42	169
C43	169
C44	169
C45	169
C46	169
C47	253
C48	169
C49	169
C50	169

SYMBOL NO.	INDEX NO.
C51	169
C52	167
C53	167
C54	167
C55	253
C56	169
C57	253
C58	169
C59	253
C60	169

SYMBOL NO.	INDEX NO.
C61	169
C62	253
C63	253
C64	253
C65	253
C66	253
C67	253
C68	253
C69	253
C70	253

SYMBOL NO.	INDEX NO.
C71	253
C72	253
C73	167
C74	167
C75	167
C76	253
C77	167
C78	167
C79	167
C80	253

SYMBOL NO.	INDEX NO.
C81	167
C82	169
C83	167
C84	169
C85	253
C86	253
C87	169
C88	169
C89	169
C90	169

SYMBOL NO.	INDEX NO.
C91	253
C92	253
C93	169
C94	169
C95	168
C96	253
C97	169
C98	253
C99	250
C100	253

41. IPU BOARD (A133)

CAPACITOR

SYMBOL NO.	INDEX NO.
C101	167
C102	169
C103	167
C104	169
C105	167
C106	167
C107	167
C108	169
C109	169
C110	167

SYMBOL NO.	INDEX NO.
C111	253
C112	253
C113	169
C114	253
C115	253
C116	253
C117	248
C118	248
C119	248
C120	248

SYMBOL NO.	INDEX NO.
C121	248
C122	253
C123	167
C124	167
C125	167
C126	169
C127	249
C128	249
C129	253
C130	253

SYMBOL NO.	INDEX NO.
C131	252
C132	253
C133	253
C134	167
C135	167
C136	167
C137	169
C138	167
C139	169
C140	167

SYMBOL NO.	INDEX NO.
C141	169
C142	169
C143	167
C144	249
C145	249
C146	247
C147	251
C148	167
C149	167
C150	253

SYMBOL NO.	INDEX NO.
C151	167
C152	167
C153	169
C154	253
C155	167
C156	253
C157	167
C158	169
C159	-----
C160	-----

SYMBOL NO.	INDEX NO.
C161	-----
C162	-----
C163	247
C164	169
C165	253
C166	253
C167	253
C168	253
C169	253
C170	167

SYMBOL NO.	INDEX NO.
C171	253
C172	253
C173	253
C174	167
C175	253
C176	-----
C177	-----
C178	-----
C179	-----
C180	253

SYMBOL NO.	INDEX NO.
C181	252
C182	167
C183	252
C184	165
C185	165
C186	169
C187	253
C188	253
C189	253
C190	169

SYMBOL NO.	INDEX NO.
C191	253
C192	253
C193	253
C194	167
C195	169
C196	-----
C197	-----
C198	169
C199	252
C200	252

SYMBOL NO.	INDEX NO.
C201	252
C202	252
C203	252
C204	252
C205	252
C206	252
C207	252
C208	252
C209	167
C210	166

SYMBOL NO.	INDEX NO.
C211	166
C212	166
C213	166
C214	252
C215	252
C216	252
C217	252
C218	252
C219	252
C220	252

SYMBOL NO.	INDEX NO.
C221	252
C222	252
C223	166
C224	166
C225	166
C226	166
C227	252
C228	252
C229	252
C230	252

SYMBOL NO.	INDEX NO.
C231	252
C232	252
C233	252
C234	252
C235	252
C236	169
C237	252
C238	252
C239	252
C240	252
C241	252

CONNECTOR

SYMBOL NO.	INDEX NO.
CN501	108
CN502	106
CN503	101
CN504	109
CN505	104
CN506	112
CN507	111
CN508	107
CN514	113
CN515	103

SYMBOL NO.	INDEX NO.
CN516	104
CN517	110
CN518	102
CN519	105
CN523	101
CN703	114
CN704	114

DA

SYMBOL NO.	INDEX NO.
DA1	121
DA2	121
DA3	121
DA4	121
DA5	121

DL

SYMBOL NO.	INDEX NO.
DL1	172

FIL

SYMBOL NO.	INDEX NO.
FIL17	173
FIL18	173
FIL19	173
FIL20	173
FIL21	173
FIL22	173
FIL23	173
FIL24	173
FIL25	173
FIL26	173

SYMBOL NO.	INDEX NO.
FIL27	173
FIL28	173
FIL29	173
FIL30	173
FIL31	173
FIL32	173
FIL33	173
FIL34	173

IC

SYMBOL NO.	INDEX NO.
IC1	145
IC2	145
IC3	145
IC4	
IC5	145
IC6	145
IC7	145
IC8	145
IC9	145
IC10	254

SYMBOL NO.	INDEX NO.
IC11	254
IC12	254
IC13	254
IC14	254
IC15	254
IC16	254
IC17	254
IC18	145
IC19	145
IC20	145

SYMBOL NO.	INDEX NO.
IC21	145
IC22	145
IC23	145
IC24	▪▪▪▪
IC25	▪▪▪▪
(SOCKET)	115
IC26	145
IC27	145
IC28	145
IC29	▪▪▪▪

SYMBOL NO.	INDEX NO.
IC30	145
IC31	▪▪▪▪
IC32	146
IC33	146
IC34	▪▪▪▪
(SOCKET)	116
IC35	
(SOCKET)	116
IC36	▪▪▪▪
IC37	▪▪▪▪

SYMBOL NO.	INDEX NO.
IC38	256
IC39	▪▪▪▪
IC40	144
IC41	255
IC42	150
IC43	▪▪▪▪
IC44	154
IC45	▪▪▪▪
IC46	149
IC47	147

SYMBOL NO.	INDEX NO.
IC48	151
IC49	▪▪▪▪
IC50	134
IC51	137
IC52	148
IC53	152
IC54	141
IC55	136
IC56	127
IC57	127

SYMBOL NO.	INDEX NO.
IC58	148
IC59	133
IC60	128
IC61	126
IC62	127
IC63	130
IC64	130
IC65	130
IC66	125
IC67	140

SYMBOL NO.	INDEX NO.
IC68	135
IC69	133
IC70	138
IC71	131
IC72	136
IC73	143
IC74	129
IC79	130
IC80	129
IC81	129

SYMBOL NO.	INDEX NO.
IC84	142
IC85	139
IC86	139

JP

SYMBOL NO.	INDEX NO.
JP1	221
JP4	221
JP7	221

41. IPU BOARD (A133)

L

SYMBOL NO.	INDEX NO.
L1	171
L2	171
L3	171
L4	175
L5	175
L6	175
L7	170
L10	175
L13	170
L16	170
L17	170

LED

SYMBOL NO.	INDEX NO.
LED1	123
LED4	124
LED8	123

Q

SYMBOL NO.	INDEX NO.
Q1	119
Q2	119
Q3	119
Q4	120
Q5	118
Q6	120
Q7	120
Q8	120
Q9	120
Q10	120

QA

SYMBOL NO.	INDEX NO.
QA1	132

REG

SYMBOL NO.	INDEX NO.
REG1	153

RESISTOR

SYMBOL NO.	INDEX NO.
R11	-----
R12	179
R13	179
R14	179
R15	179
R16	179
R17	-----
R18	-----
R19	-----
R20	-----

SYMBOL NO.	INDEX NO.
R21	-----
R22	181
R23	195
R24	192
R25	194
R26	186
R27	190
R28	193
R29	179
R30	185

SYMBOL NO.	INDEX NO.
R31	195
R32	195
R33	195
R34	186
R35	195
R36	186
R37	186
R38	186
R39	195
R40	180

SYMBOL NO.	INDEX NO.
R41	179
R42	186
R43	195
R44	186
R45	189
R46	189
R47	189
R48	189
R49	189
R50	189

SYMBOL NO.	INDEX NO.
R51	189
R52	189
R53	189
R54	189
R55	182
R56	182
R57	188
R58	186
R59	180
R60	186

SYMBOL NO.	INDEX NO.
R61	186
R62	195
R63	195
R64	195
R65	232
R66	225
R67	179
R68	178
R69	191
R70	180

SYMBOL NO.	INDEX NO.
R71	230
R72	195
R73	195
R74	199
R75	199
R76	199
R77	179
R78	195
R79	180
R80	189

SYMBOL NO.	INDEX NO.
R81	180
R82	195
R83	195
R84	195
R85	186
R86	195
R87	186
R88	186
R89	195
R90	186

SYMBOL NO.	INDEX NO.
R91	180
R92	179
R93	230
R94	227
R95	180
R96	178
R97	226
R98	179
R99	223
R100	222

SYMBOL NO.	INDEX NO.
R101	180
R102	184
R103	196
R104	187
R105	189
R106	180
R107	180
R108	180
R109	180
R110	179

41. IPU BOARD (A133)

RESISTOR

SYMBOL NO.	INDEX NO.
R111	179
R112	180
R113	178
R114	178
R115	199
R116	179
R117	191
R118	178
R119	195
R120	185

SYMBOL NO.	INDEX NO.
R121	199
R122	178
R123	183
R124	178
R125	179
R126	180
R127	182
R128	182
R129	182
R130	182

SYMBOL NO.	INDEX NO.
R131	182
R132	182
R133	180
R134	182
R135	182
R136	182
R137	182
R138	182
R139	182
R140	182

SYMBOL NO.	INDEX NO.
R141	182
R142	182
R143	182
R144	182
R145	182
R146	182
R147	182
R148	180
R149	189
R150	180

SYMBOL NO.	INDEX NO.
R151	189
R152	189
R153	180
R154	180
R155	180
R156	185
R157	179
R158	183
R159	178
R160	178

SYMBOL NO.	INDEX NO.
R161	183
R162	183
R163	183
R164	185
R165	185
R166	229
R167	228
R168	178
R169	195
R170	182

SYMBOL NO.	INDEX NO.
R171	182
R172	178
R173	182
R174	194
R175	182
R176	184
R177	182
R178	178
R179	180
R180	182

SYMBOL NO.	INDEX NO.
R181	189
R182	182
R183	185
R184	180
R185	182
R186	178
R187	193
R188	198
R189	197
R190	198

SYMBOL NO.	INDEX NO.
R191	198
R192	198
R193	198
R194	198
R195	198
R196	198
R197	231
R198	226
R199	233
R200	224

SYMBOL NO.	INDEX NO.
R201	179
R202	179
R203	194
R204	-----
R205	-----
R206	-----
R207	194
R208	182
R209	182
R210	182

SYMBOL NO.	INDEX NO.
R211	195
R212	182
R213	182
R214	182
R215	182
R216	182
R217	-----
R218	-----
R219	176
R220	189

SYMBOL NO.	INDEX NO.
R221	197
R22	197
R223	180
R224	189
R225	189
R226	202
R227	202
R228	202
R229	202
R230	202

SYMBOL NO.	INDEX NO.
R231	202
R232	202
R233	202
R234	202
R235	180
R236	180
R237	180
R238	180
R239	180
R240	180

SYMBOL NO.	INDEX NO.
R241	180
R242	180
R243	180
R244	185
R245	179
R246	180
R247	180
R248	185
R249	180
R250	179

41. IPU BOARD (A133)

RESISTOR

SYMBOL NO.	INDEX NO.
R251	180
R252	180
R253	180
R254	179
R255	180
R256	195
R257	195
R258	195
R259	180
R260	180

SYMBOL NO.	INDEX NO.
R261	180
R262	180
R263	180
R264	179
R265	180
R266	195
R267	195
R268	195
R269	180
R270	180

SYMBOL NO.	INDEX NO.
R271	180
R272	185
R273	179
R274	180
R275	179
R276	180
R277	200
R278	200
R279	200
R280	200

SYMBOL NO.	INDEX NO.
R281	189
R282	189
R283	177
R284	200
R285	200
R286	189
R287	189
R288	189
R289	189
R290	189

SYMBOL NO.	INDEX NO.
R291	201
R292	201
R293	201
R294	201
R295	201
R296	201
R297	201
R298	201
R299	201
R300	201

SYMBOL NO.	INDEX NO.
R301	201
R302	201
R303	201
R304	201
R305	201
R306	201
R307	201
R308	201
R309	201
R310	201

SYMBOL NO.	INDEX NO.
R311	189
R312	189
R320	177
R321	189
R322	189
R323	189
R324	201
R325	201
R326	201
R327	201

SYMBOL NO.	INDEX NO.
R328	201
R329	201
R330	201
R331	201
R332	201
R333	189
R339	201
R340	201
R341	201
R342	201

SYMBOL NO.	INDEX NO.
R343	201
R344	201
R346	201
R346	201
R347	201
R348	201
R349	-----
R350	-----
R351	-----
R352	193

SYMBOL NO.	INDEX NO.
R353	193
R354	193
R355	177
R356	177
R357	201
R358	201
R359	201
R360	201
R361	201
R362	201

SYMBOL NO.	INDEX NO.
R363	201
R364	201
R365	201
R366	201
R367	201
R368	201
R369	201
R370	189
R371	189
R372	177

SYMBOL NO.	INDEX NO.
R373	189
R374	189
R375	189
R376	189
R377	189
R378	189
R379	200
R380	200
R381	200
R382	200

VR

SYMBOL NO.	INDEX NO.
VR1	164
VR2	164

XTL

SYMBOL NO.	INDEX NO.
XTL1	157
XTL2	158
XTL3	155
XTL4	156

ZD

SYMBOL NO.	INDEX NO.
ZD1	122
ZD2	122

41. IPU BOARD (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
*	A133 7890	EX-IPU Board	1
1	A100 5406	IC - Analog Prosessing	1
3	A133 7693	IC - UVEPROM 2MX8 150nS	1
4	A133 7696	IC - UVEPROM 2MX8 100nS	1
5	A134 5210	IC - D302102	1
6	A134 5212	IC - M66349AFP	1
7	A134 5214	IC - NG62GO14R38F	1
8	A134 5215	IC - RF5GV94	1
8	A134 5216	IC - RS5C267	1
9	A134 5218	IC - UPD65641GJ-PO1-3EN	1
10	A134 5219	IC - RF5C245A	1
11	A540 5171	IC - HD6473298P6 OTP	
12	A540 5201	IC - M65791FP FBTC	
13	A540 5203	IC - UPD65622 GAFVR	

Index No.	Part No.	Description	Q'ty Per Assembly
101	1102 4201	Connector - 2p	
102	1102 4204	CT Header - 5p	
103	1102 4205	CT Header- 6p	
104	1102 4207	Connector - 8p	
105	1102 4212	CT Header - 15p	
106	1102 4468	CT Header - 10p	
107	1102 4497	Connector - 13p	
108	1102 4506	Connector - 20p	
109	1102 4619	Connector - 2p	
110	1102 4620	CT Connector - 2p	
111	1102 4630	CT Connector	
112	1102 5301	Connector - 2P	
113	1102 5331	Connector - 8p	
114	1102 6811	Connector	
115	1104 0370	IC Socket - 64p	
116	1104 0473	32p - IC Socket	
117	1206 0041	Lithium Cell - BR2330	
118	1400 0382	Transistor - 2SA1037KR	
119	1400 0392	Transistor - DTC114EK	
120	1400 0398	Transistor - 2SC2412K	
121	1402 1142	Diode Array - DAN217	
122	1402 1216	Diode - DTZ5.6B	
123	1403 0828	Diode - SEC1901C	
124	1403 0829	Diode - SEC1201C	
125	1407 1600	TTLIC - SN74LS244NS	
126	1407 1741	TTL - SN74LS32NS	
127	1407 2081	TTLIC - SN74LS08NS	
128	1407 2143	TTLIC - 74F244SJ	
129	1407 2147	TTLIC - 74F374SJ	
130	1407 2187	TTLIC - SN74LS07NS	
131	1407 2218	TTLIC - SN74LS06NS	
132	1407 2231	IC - TD62308AF	
133	1407 2781	TTL - SN74AS04NS	
134	1407 2783	IC - SN74AS00NS	
135	1407 2833	TTLIC - SN74ALS273NS	

41. IPU BOARD (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
136	1407 2896	TTLIC - 74F113SJ	
137	1407 3008	TTL - SN74ALS244CNS	
138	1407 3082	TTL - SN74AS244NS	
139	1407 3083	IC - SN74AS373NS	
140	1407 3381	CMOS - IC - TC74HC4066AF	
141	1407 3481	IC - SN74AS32NS	
142	1407 3725	IC - TC74ACT138F	
143	1407 3728	IC - TC74ACT244F	
144	1407 3964	IC - CXD1175AM	
145	1407 4091	IC - M66251AFP	
146	1407 4092	IC - M66253FP	
147	1407 4109	IC - CXD1175AM	
148	1407 4322	IC - TD74ABT374F	
149	1407 4329	IC - M66255FP	
150	1407 4330	IC - UPD70433GD-5BB	
151	1407 4335	IC - M66236FP	
152	1408 0595	IC - NJM2904M	
153	1408 0756	IC - NJM78L05VA	
154	1408 1082	IC - M62354FP	
155	1503 0233	Oscillator - 16MHz	
156	1503 0443	Crystal Oscillator - 20MHz	
157	1503 0563	Oscillator-9.83MHz040	
158	1503 0581	Oscillator - at-49 32.8MHz	
159	1601 7750	Resistor - 22k Ω ±5.00%	
160	1601 7751	Resistor - 4.7k Ω ±5%	
161	1601 7752	Resistor - 10k Ω ±5.00%	
162	1601 7780	Resistor - 47k Ω ±5%	
163	1601 7781	Resistor - 10 Ω ±5%	
164	1601 8145	Variable Resistor - 5k Ω 0.5W	
165	1605 0223	Capacitor - 20pF 50V	
166	1605 0511	Capacitor - 0.22µF 25V	
167	1605 0573	Capacitor - 0.1µF ±20% 25V	
168	1605 0685	Capacitor - 0.47µF	
169	1606 1139	Capacitor - 0.01µF ±20%	
170	1607 0280	Inductor - BLM41	

Index No.	Part No.	Description	Q'ty Per Assembly
171	1607 0494	IC - LALO4NA220K	
172	1607 0697	IC - AT-10	
173	1607 0705	Noize Filter - ACF51832-470	
174	1607 0706	Noize Filter - ACF51832-220	
175	1607 0723	Noize Filter - N2012Z121	
176	1630 2471	Resistor - 470Ω 1/8W ±5%	
177	1630 3100	Resistor - 10 Ω ±5% 1/10W	
178	1630 3101	Resistor - 100Ω - 1/10W	
179	1630 3102	Resistor - 1k Ω 1/10W ±5%	
180	1630 3103	Resistor - 10k Ω 1/10W ±5%	
181	1630 3122	Resistor - 1.2k Ω 1/10W ±5%	
182	1630 3150	Resistor - 15 Ω ±5% 1/10w	
183	1630 3152	Resistor - 1.5kΩ - 1/10W	
184	1630 3221	Resistor - 220 Ω ±5% 1/10W	
185	1630 3222	Resistor - 2.2k Ω 1/10W ±5%	
186	1630 3223	Resistor - 22kΩ - 1/10W	
187	1630 3243	Resistor - 24k Ω ±5% 1/10W	
188	1630 3273	Resistor - 27kΩ - 1/10W	
189	1630 3330	Resistor - 33 Ω ±5% 1/10W	
190	1630 3331	Resistor - 330 Ω ±5% 1/10W	
191	1630 3332	Resistor - 3.3kΩ 1/10W ±5%	
192	1630 3334	Resistor - 330k Ω ±5% 1/10W	
193	1630 3470	Resistor - 47Ω 1/10W ±5%	
194	1630 3471	Resistor - 470Ω - 1/10W	
195	1630 3472	Resistor - 4.7k Ω 1/10W ±5%	
196	1630 3474	Resistor - 470k Ω ±5% 1/10W	
197	1630 3560	Resistor - 56 Ω ±5% 1/10W	
198	1630 3680	Resistor - 68 Ω ±5% 1/10W	
199	1630 3681	Resistor - 680 Ω ±5% 1/10W	
200	1630 4100	Resistor - 10 Ω ±5% 1/16W	
201	1630 4330	Resistor - 33 Ω ±5% 1/8W	
202	1630 4473	Resistor - 47k Ω ±5% 1/16W	
203	1633 0000	Resistor - 0Ω 1/10W:Jamper Chip	

41. IPU BOARD (A133)

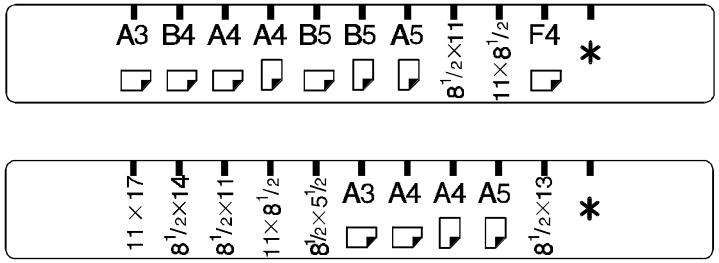
Index No.	Part No.	Description	Q'ty Per Assembly
204	1633 1602	Resistor - 16k Ω ±1% 1/4W	
205	1633 1202	Resistor - 2.0k Ω ±5% 1/4W	
206	1633 1802	Resistor - 18k Ω ±1% 1/4W	
207	1633 2701	Resistor - 2.7k Ω ±1% 1/10W	
208	1633 3602	Resistor - 36k Ω ±1% 1/10W	
209	1633 3901	Resistor - 3.9 Ω ±1% 1/10W	
210	1633 4700	Resistor - 470 Ω ±1% 1/10W	
211	1633 6800	Resistor - 680 Ω ±1% 1/10W	
212	1633 7501	Resistor - 7.5k Ω ±1% 1/10W	
213	1633 7502	Resistor - 57k 0HM ±1% 1/10W	
214	1633 8201	Resistor - 8.2k Ω ±1% 1/10w	
215	1633 9101	Resistro - 9.1k Ω 1/10W	
216	1640 2470	Capacitor - 47µF ±20% 25V	
217	1640 5109	Capacitor - 1µF ±20% 50V	
218	1640 5470	Capacitor - 47µF ±20% 50V	
219	1640 5479	Capacitor - 4.7µF ±20% 50V	
230	1642 0470	Capacitor - 47µF ±20% 10V	
231	1642 2470	Capacitor - 47µF ±20% 25V	
232	1643 1470	Capacitor - 47µF ±20% 16V	
233	1644 0100	Capacitor - 10µF ±20% 10V	
234	1644 0330	Capacitor - 33µF ±20% 10V	
235	1644 0470	Capacitor - 47µF ±20% 10V	
236	1644 2330	Capacitor - 33µF ±20% 10V	
237	1644 2479	Capacitor - 4.7µF ±20% 25V	
238	1644 5109	Capacitor - 1µF ±20% 25V	
239	1660 1100	Capacitor - 10pF 50V	
240	1660 3101	Capacitor - 100pF 50V	
241	1660 3150	Capacitor - 15pF 50V	
242	1660 5102	Capacitor - 1000pF ±10% 50V	
243	1660 7103	Capacitor - 10000pF 50V	
244	1660 7104	Capacitor - 100000pF 50V	
245	1660 9104	Capacitor - 0.1µF 25V	
246	1901 0008	DRAM - 4M1X470NS G2	
247	1902 0021	IC - SRAM - 1M - X8 - 100NS/G4	

Index No.	Part No.	Description	Q'ty Per Assembly
248	1902 0023	IC - SRAM 64KX8100NS G4	

42. DECAL AND DOCUMENT (A133)

1

2



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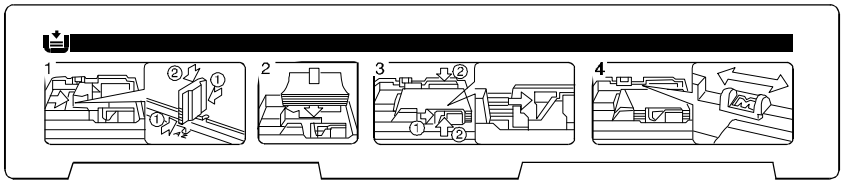

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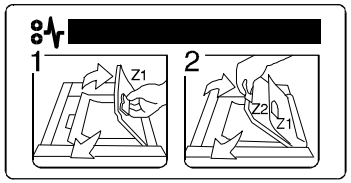

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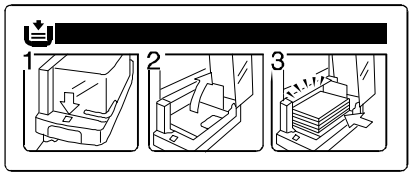

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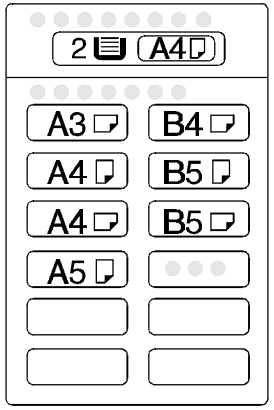

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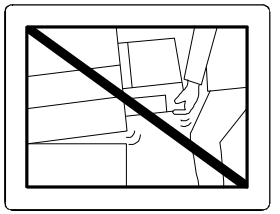

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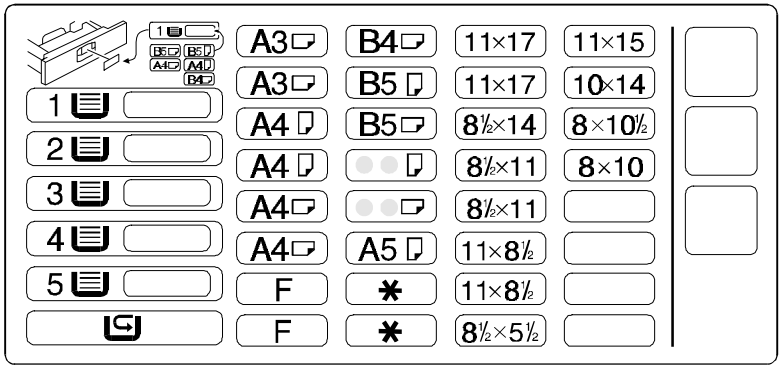

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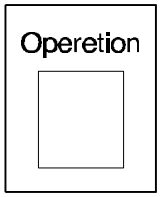

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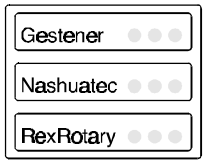

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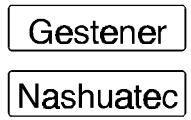
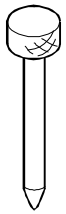
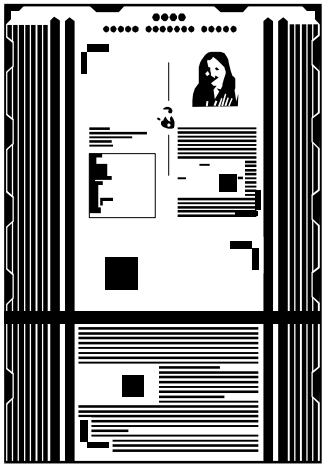
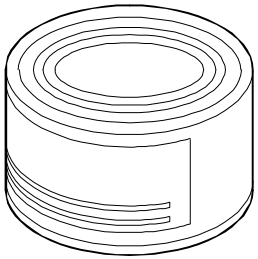
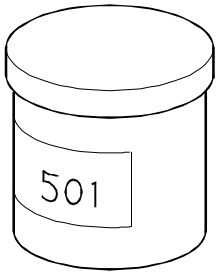
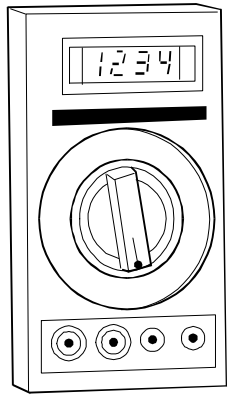
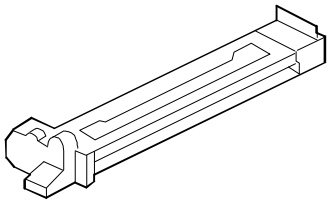
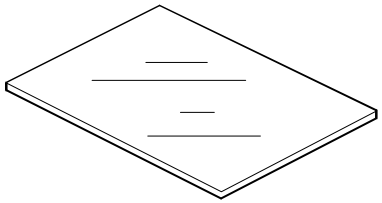
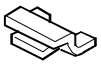
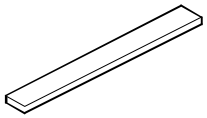


42. DECAL AND DOCUMENT (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	AA00 0181	Caution Decal - Toner Collect. Tank	1
2	A133 7292	Decal - Paper Size	1
2	A133 7293	Decal - Paper Size	1
3	A134 2997	Decal - Paper Setting	1
4	A134 4884	Decal - Duplex Misfeed Removal	1
5	A155 6113	Decal - Paper Set	1
6	AA00 2206	Decal - Paper Size	1
7	A155 6114	Caution Decal - LCT	1
8	AA00 2209	Decal - Paper Size	1
9	A133 8697	Operating Instructions - English LT (NRG)	1
9	A133 8650	Operating Instructions - English LT (SVN)	1
9	A133 8660	Operating Instructions - English LT (INF)	1
9	A133 8607	Operating Instructions - English LT	1
10	A153 6406	Model Name Plate - GER	1
11	AA00 1383	Decal - Energy Star	1
12	A153 6409	Decal - Keytop Cover (NRG-EU)	1
12	C225 2867	Decal - Cover - Panel - Nashua	1

Index No.	Part No.	Description	Q'ty Per Assembly

43. SPECIAL TOOLS (A133)

1 	2 	3 	4 	5 
6 	7 	8 	9 	

43. SPECIAL TOOLS (A133)

Index No.	Part No.	Description	Q'ty Per Assembly
1	A006 9104	Scanner Positioning Pin (4 pcs/set)	1
2	5420 9516	Test Chart - OS-A3 (10 pcs/set)	1
3	5447 9078	Heat Resistant Grease - MT-78	1
4	5203 9501	Silicone Grease G-501	1
5	5420 9507	Digital Multimeter	1
6	A134 9011	Charge Corona Unit With Cleaner	1
7	A130 9005	Exposure Glasse With Electoric Conductor Coati	1
8	A130 9006	Grounding Plate - Exposure Glass	1
9	AC06 0002	White Plate	1

Index No.	Part No.	Description	Q'ty Per Assembly

PARTS INDEX

Part No.	Description	Page and Index No.
A133 3185	Gear - Toner Bottle (RIC - 115V)	43- 1
A133 3195	Gear - Toner Bottle (SVN/INF/NRG)	43- 1
A133 5104	IC - UVEPROM 4MX16 150NS	89- 1
A133 7007	By-pass Feed Bracket	29- 10
A133 7008	Grounding Plate - Large	83- 9
A133 7009	Grounding Plate - Small	83- 19
A133 7017	Right Grip Plate	77- 13
A133 7017	Right Grip Plate	79- 16
A133 7023	Fusing Entrance Stay	31- 8
A133 7027	Registration Rolller Cleaner	31- 25
A133 7031	Idler Bracket	31- 28
A133 7037	Front LCT Frame	29- 8
A133 7040	Rail - LCT	29- 11
A133 7046	Rear LCT Frame	29- 12
A133 7060	Upper LCT Frame	29- 13
A133 7064	Magnet Clutch Bracket	29- 14
A133 7066	Bracket - Right Inner Cover	29- 7
A133 7073	Front Upper Cover	11- 17
A133 7084	Front Cover (RIC)	11- 20
A133 7094	Right Cover	11- 14
A133 7097	Right Hinge Bracket	77- 22
A133 7098	Total Caunter Cover	77- 17
A133 7099	Braclet - Rear Cover	79- 12
A133 7102	Left Cover	11- 3
A133 7106	Front Cover (NRG)	11- 20
A133 7109	Front Cover (SVN)	11- 20
A133 7111	Front Cover (INF)	11- 20
A133 7112	Emblem (SVN)	11- 24
A133 7118	Operation Panel Ass'y (RIC/NRG LT)	11- 26
A133 7119	Operation Panel Ass'y (A4)	11- 26
A133 7120	Operation Panel Ass'y (SVN)	11- 26
A133 7144	1st Scanner Ass'y	33- 11
A133 7145	Spring Plate - Scanner Rail	35- 20
A133 7146	Spring Plate - Rear Scanner Rail	37- 27

Part No.	Description	Page and Index No
A133 7148	Spring Plate - Lens Block	35- 19
A133 7149	Lens Block Supporter	37- 5
A133 7151	Left Bracket - IPU	35- 18
A133 7152	Right Bracket - IPU	35- 17
A133 7155	Left Scale (LT)	11- 9
A133 7157	Rear Scale (LT)	11- 7
A133 7159	LD Unit Cover (230V)	37- 4
A133 7165	Guide Harness LD (230V)	39- 18
A133 7173	LD Unit (230V)	39- 3
A133 7226	Lower Development Stay	31- 27
A133 7238	Decal - Toner Collection Bottle	41- 21
A133 7292	Decal - Paper Size	101- 2
A133 7293	Decal - Paper Size	101- 2
A133 7299	Stopper - Clutch	71- 2
A133 7309	By-pass Feed Table Ass'y	19- 1
A133 7310	Front Plate - By-pass Feed	21- 18
A133 7312	Rear Plate - By-pass Feed	21- 7
A133 7314	Stay - By-pass Feed	21- 14
A133 7318	Guide Plate - Separator	21- 5
A133 7320	Drive Shaft - Feed Roller	21- 11
A133 7321	Shaft - Separation	21- 12
A133 7323	Arm - Pick-up	23- 11
A133 7325	Paper Feed Stay	23- 8
A133 7328	Paper End Actuator	23- 10
A133 7329	Guide Plate - Paper Feed	21- 2
A133 7331	Harness Bracket	23- 9
A133 7332	Pressure Lever - Pick-up	23- 3
A133 7333	Paper Feed Solenoid - LCT	23- 2
A133 7336	By-pass Feed Solenoid	23- 1
A133 7337	Solenoid Bracket	23- 12
A133 7339	Stopper	23- 6
A133 7341	Front Side Fence - By-pass	21- 17
A133 7343	Rear Side Fence - By-pass	21- 8
A133 7344	Bracket - Relay Sensor	23- 4

Part No.	Description	Page and Index No.
A133 7345	Sensor Bracket	23- 5
A133 7347	By-pass Feed Table	19- 9
A133 7355	LCT Motor Cover	25- 29
A133 7358	Pressure Spring Plate	25- 28
A133 7360	Positioning Plate - LCT	25- 32
A133 7361	Bracket - Positioning Plate	25- 26
A133 7364	Rail - LCT	25- 27
A133 7369	Micro Switch	25- 34
A133 7371	LCT Front Cover	25- 17
A133 7375	Joint - Vertical Transport	29- 6
A133 7376	Upper Stay	25- 9
A133 7377	End Fence	25- 1
A133 7383	Hinge - Vertical Transport	29- 17
A133 7385	Bracket - Vertical Transport	29- 5
A133 7386	Pressure Guide - Vertical Transport	29- 4
A133 7388	Fulcrum Bracket - Vertical Trans.	29- 15
A133 7392	Hinge Bracket	25- 8
A133 7521	Exit Cover	59- 10
A133 7693	IC - UVEPROM 2MX8 150nS	91- 3
A133 7696	IC - UVEPROM 2MX8 100nS	91- 4
A133 7705	Relay Board	79- 15
A133 7707	AC Drive Board (115V)	73- 9
A133 7710	AC Drive Board - (230V)	73- 9
A133 7714	SCU Board - 230V (NRG)	73- 4
A133 7714	SCU Board - 230V (NRG)	87- *
A133 7715	SCU Board (115V)	73- 4
A133 7715	SCU Board (115V)	87- *
A133 7717	IC - UVEPROM 4M X16 150NS (LT)	73- 19
A133 7717	IC - UVEPROM 4MX16 150NS (LT)	87- 2
A133 7720	IC - UVEPROM 4M X16 150NS (LT)	73- 20
A133 7720	IC - UVEPROM 4MX16 150NS (LT)	87- 3
A133 7723	IC - TC160G22AF-1024 (LT)	87- 1
A133 7725	SCU Board - 230V (RIC/INF)	73- 4
A133 7725	SCU Board - 230V (RIC/INF)	87- *

Part No.	Description	Page and Index No
A133 7726	BCU Board	73- 13
A133 7726	BCU Board	89- *
A133 7735	Harness - DC Main - Rear	73- 12
A133 7736	Harness - DC Main	73- 11
A133 7736	Harness - DC Main	75- 18
A133 7737	AC Main Harness - 115V	73- 10
A133 7737	AC Main Harness - 115V	75- 11
A133 7738	Harness - By-pass Feed	23- 7
A133 7739	Vertical harness	29- 19
A133 7742	Harness - DC Main - Front	73- 1
A133 7742	Harness - DC Main - Front	73- 12
A133 7743	LCT Harness	27- 24
A133 7744	AC Main Harness - 230V	73- 10
A133 7744	AC Main Harness - 230V	75- 11
A133 7745	Fusing Harness - 230V	55- 16
A133 7760	Relay Harness - Circuit Breaker (230V)	79- 14
A133 7774	Harness LD Unit (230V)	35- 5
A133 7775	Bracket - Interlock Switch	77- 1
A133 7781	Bracket - Circuit Breaker (230V)	79- 13
A133 7784	Power Pack Bracket	77- 23
A133 7785	Spring Plate - Power Pack	77- 24
A133 7786	Grounding Plate Bracket - SCU (230V)	73- 22
A133 7788	Spring Plate - HDD	79- 17
A133 7789	Spring Plate - SCU (230V)	73- 23
A133 7883	Bracket - HDD	79- 1
A133 7884	HDD - 1G - SCSI	79- 2
A133 7890	EX-IPU Board	35- 1
A133 7890	EX-IPU Board	91- *
A133 7912	Grounding Wire - Lens Block 1	35- 22
A133 7913	Grounding Wire - Lens Block 2	35- 21
A133 7920	Harness HDD (230V)	35- 23
A133 7920	HDD Harness	79- 3
A133 8607	Operating Instructions - English LT	101- 9
A133 8650	Operating Instructions - English LT (SVN)	101- 9

Part No.	Description	Page and Index No.
A133 8660	Operating Instructions - English LT (INF)	101- 9
A133 8697	Operating Instructions - English LT (NRG)	101- 9
A133 9510	OPC Drum	49- 10

Part No.	Description	Page and Index No
AA00 0180	Decal - Toner Collection (LT)	41- 22
AA00 0181	Caution Decal - Toner Collect. Tank (A4)	41- 22
AA00 0181	Caution Decal - Toner Collect. Tank	101- 1
AA00 1369	Decal - Adding Toner	43- 24
AA00 1383	Decal - Energy Star	11- 30
AA00 1383	Decal - Energy Star	101- 11
AA00 2206	Decal - Paper Size	101- 6
AA00 2209	Decal - Paper Size	101- 8
AA01 0083	Ozone Filter - 64x45x30	75- 5
AA01 2077	Dust Filter - Exhaust Fan	75- 20
AA01 2078	Dust Filter - Vacuum Fan	83- 6
AA01 2079	Dust Filter	11- 4
AA04 3364	Timing Belt - S3M300	71- 8
AA04 3365	Timing Belt - S3M318	69- 18
AA04 3366	Timing Belt - S2M380	69- 29
AA04 3367	Timing Belt - S3M432	67- 5
AA04 3368	Timing Belt - S3M609	67- 4
AA04 3368	Timing Belt - S3M609	71- 26
AA04 3369	Timing Belt - S3M267	67- 16
AA04 3372	Timing Belt - S2M400	37- 16
AA04 3373	Timing Belt - S2M308	63- 4
AA04 3374	Timing Belt - S2M800	65- 17
AA04 3411	Timing Belt - S2M 300	67- 26
AA04 3456	Timing Belt - S3M167	27- 12
AA05 0085	Scanner Wire	37- 22
AA05 1022	Drive Wire	67- 18
AA05 1022	Drive Wire	77- 4
AA06 0103	Solenoid Spring	55- 12
AA06 0189	Spring - Stripper Pawl Plate	67- 9
AA06 0221	Gripper Solenoid Spring	37- 9
AA06 0453	Relay Adjusting Spring	71- 22
AA06 0523	Pick-up Pressure Sping	17- 18
AA06 0534	Tray Lock Spring - 19mm	81- 4
AA06 0575	Release Spring	17- 30

Part No.	Description	Page and Index No.
AA06 0577	Release Spring	17- 10
AA06 0593	Spring	63- 38
AA06 0604	Spring - 230gf	67- 19
AA06 0636	Pressure Spring	17- 28
AA06 0638	Pressure Spring	23- 13
AA06 0639	Pressure Spring	23- 14
AA06 0658	Spring	57- 9
AA06 0663	Spring - Tightener	71- 11
AA06 0666	Tenshion Spring : 12N	85- 4
AA06 2271	Release Spring	67- 11
AA06 2271	Release Spring	69- 33
AA06 2284	Pressure Spring	41- 10
AA06 3239	Spring - Handle	25- 20
AA06 3242	Registration Pressure Spring - Rear	31- 3
AA06 3246	Pressure Spring	21- 13
AA06 3248	Charge Terminal Spring	41- 4
AA06 3249	Grid Terminal Spring	41- 5
AA06 3269	Pressure Spring	49- 6
AA06 3270	Pressure Spring	41- 17
AA06 3366	Chuck Spring	43- 8
AA06 3367	Pressure Spring	43- 11
AA06 3370	Spring	65- 16
AA06 3373	Spring - 60mm	51- 8
AA06 3380	Spring - 16mm	69- 21
AA06 3382	Pressure Spring	45- 14
AA06 3385	Pressure Spring	63- 27
AA06 3487	Spring - 10mm	17- 34
AA06 3487	Spring - 10mm	21- 19
AA06 3487	Spring - 10mm	29- 23
AA06 6094	End Fence Spring	65- 27
AA06 6240	Pressure Spring	53- 16
AA06 6250	Pressure Spring	51- 12
AA06 6251	Pressure Spring	51- 14
AA07 0034	Slide Rail	85- 5

Part No.	Description	Page and Index No
AA08 0034	Bushing - 4x5x7	21- 4
AA08 0034	Bushing - 4x5x7	29- 21
AA08 0128	Bushing - 6x9x8	63- 28
AA08 0147	Front Bushing	41- 34
AA08 0148	Rear Bushing	41- 29
AA08 0155	Rear Pawl Bushing	51- 15
AA08 0156	Bushing - M4	17- 33
AA08 0171	Bushing	31- 2
AA08 0172	Bushing	31- 26
AA08 0176	Bushing	47- 10
AA08 0178	Bushing - M5	47- 12
AA08 2045	Cleaning Brush Bushing	51- 6
AA08 2046	Bushing - 6x12x6	17- 13
AA08 2046	Bushing - 6x12x6	21- 21
AA08 2047	Bushing - 8x16x7	17- 20
AA08 2047	Bushing - 8x16x7	21- 20
AA08 2047	Bushing - 8x16x7	23- 18
AA08 2047	Bushing - 8x16x7	31- 16
AA08 2047	Bushing - 8x16x7	69- 34
AA08 2051	Bushing - M8	53- 6
AA08 2054	Bushing - M4	53- 5
AA08 2058	Bushing - 6x10x9mm	59- 4
AA08 2063	Bushing - 8x10x5	57- 15
AA08 2064	Bushing - 10mm	81- 6
AA08 3009	Clutch Roller - 8x18x11	17- 12
AA08 3009	Clutch Roller - 8x18x11	31- 18
AA08 4047	Bushing Case	47- 11
AA11 1208	Paper End Sensor Feeler	63- 9
AA12 0067	Antistatic Brush	61- 16
AA13 2013	Spacer - 8.2	67- 12
AA13 2025	Spacer - 1x8x12	53- 32
AA13 2094	Spacer - Mounting Arm	47- 13
AA13 2174	Spacer - M8	33- 2
AA13 2174	Spacer - M8	71- 30

Part No.	Description	Page and Index No.
AA13 2184	Motor Cushion	63- 48
AA13 4092	Flange - Fly Wheel	69- 31
AA14 0291	Bottom Plate Shaft	65- 6
AA14 0542	Feed Roller Shaft	17- 6
AA14 0547	Drive Shaft	37- 21
AA14 0576	LCT Drive Shaft	27- 15
AA14 0597	Shaft - Paper Feed	23- 20
AA14 3062	Shoulder Screw - M4	55- 22
AA14 3219	Stepped Screw	11- 8
AA14 3301	Stepped Screw - M3x4	75- 15
AA14 3307	Stepped Screw - M3x4	63- 23
AA14 3410	Stepped Screw - M4	43- 10
AA14 3424	Knob Screw - M4x8	41- 11
AA14 3454	Stepped Screw - M3	11- 10
AA14 3461	Stepped Screw - M2.5	25- 33
AA14 3712	Chuck Shaft	43- 5
AA14 3713	Shaft - Release Stay	53- 30
AA14 3715	Stepped Screw - M5	55- 8
AA14 3718	Stepped Screw - M4	11- 31
AA14 3724	Stepped Screw	81- 27
AA14 3737	Srepped Screw	85- 6
AA14 5530	Drive Shaft	69- 10
AA14 5532	Drive Shaft	69- 7
AA14 8252	End Fence Shaft	65- 28
AA14 8413	Idle Gear Shaft	43- 22
AA14 8418	Relay Shaft	69- 22
AA14 8447	Guide Pin - Platen Cover	11- 6
AA14 8447	Guide Pin - Platen Cover	13- 11
AA15 0234	Mylar Seal - Base	35- 6
AA15 0636	Seal - 90x29.5x0.2	33- 17
AA15 1882	Seal - 32x4x1	45- 19
AA15 1889	Entrance Seal - Toner Supply Unit	45- 3
AA15 1891	Shutter Seal	43- 15
AA15 1894	Seal - 67x53x2	43- 2

Part No.	Description	Page and Index No
AA15 1900	Seal - Toner Shield Glass	39- 12
AA15 1922	Seal - 12x75x4	53- 17
AA15 1998	Cushion - 10x30x5	19- 17
AA15 2302	Seal	39- 17
AA15 2358	Sponge - 57x24x20	11- 16
AA16 1067	Cushion - Motor	63- 45
AA16 1105	Cleaner Cushion	41- 26
AA16 2053	Platen Cover Pad	13- 2
AA16 2068	Guide Plate Pad	61- 20
AA16 2069	Guide Plate Pad	61- 19
AB01 0087	Gear - 20Z	41- 28
AB01 1133	Gear - 49Z	27- 14
AB01 1150	Gear - 20Z	47- 2
AB01 1153	Idle Gear - 25Z	71- 13
AB01 1161	Gear - 20Z	47- 6
AB01 1162	Gear - 16Z	47- 4
AB01 1163	Gear - 33Z	47- 14
AB01 1165	Gear - 32Z	63- 34
AB01 1166	Gear - 33Z	63- 13
AB01 1167	Gear - 25Z	63- 32
AB01 1169	Gear - 28Z	71- 14
AB01 1170	Gear - 36Z	71- 3
AB01 1355	Gear - 36Z	69- 2
AB01 3420	Gear - 18Z	17- 22
AB01 3420	Gear - 18Z	21- 9
AB01 3485	Gear - 20Z	31- 5
AB01 3486	Gear - 14Z	31- 1
AB01 3569	Gear - 20Z	53- 21
AB01 3868	Gear - 16Z	15- 14
AB01 3871	Gear - 40Z	69- 16
AB01 3872	Fusing Cam Gear - 28Z	67- 24
AB01 3873	Gear - 26Z	51- 4
AB01 3875	Reverse Gear - 27Z	71- 28
AB01 3877	Gear - 28Z	47- 5

Part No.	Description	Page and Index No.
AB01 3878	Gear - 29Z	47- 1
AB01 3879	Gear - 20Z	47- 9
AB01 3880	Gear - 20Z	47- 8
AB01 3881	Gear - 31Z	65- 12
AB01 3883	Idle Gear - 25Z	55- 3
AB01 3884	Exit Gear - 17Z	57- 3
AB01 3885	Idle Gear - 20Z	57- 2
AB01 3886	Gear - 18Z	45- 2
AB01 3887	Gear - 16Z	45- 12
AB01 3888	Gear - 18Z	69- 8
AB01 3889	Gear - 24Z	59- 18
AB01 3891	Gear - 30Z	53- 10
AB01 3892	Gear - 18Z	53- 8
AB01 3893	Gear - 29Z	69- 28
AB01 3985	Gear - 40Z	55- 20
AB01 5013	Rack	85- 7
AB01 7323	Cam Gear - 35z	51- 19
AB01 7332	Gear - 24Z/41Z	63- 33
AB01 7333	Timing Pulley - 35/25Z	71- 7
AB01 7335	Timing Pulley - 22Z/37Z	71- 5
AB01 7336	Timing Pulley - 30Z/35Z	71- 23
AB01 7337	Gear - 15Z/55Z	63- 39
AB01 7339	End Fence Gear - 22Z/58Z	65- 14
AB01 7340	Timing Pulley - 30/35/25Z	69- 17
AB01 7342	Timing Pulley - 36/25Z	67- 7
AB01 7344	Timing Rulley - 25/20Z	67- 21
AB01 7345	Timing Pulley - 35Z	67- 15
AB01 7346	Exit Gear	67- 25
AB01 7347	Idle Gear	43- 21
AB01 7351	Timing Pulley - 30T	69- 11
AB01 7352	Gear - 41/22Z	69- 1
AB01 7377	Gear - 25Z	71- 4
AB01 7400	Gear- 18Z/68Z	65- 13
AB03 0169	Timing Pulley - 120Z	69- 30

Part No.	Description	Page and Index No
AB03 0281	Timing Pulley - 28Z	27- 9
AB03 0455	Tightener Pulley - 8x20x13	71- 12
AB03 0459	Timing Pulley -22Z	37- 12
AB03 0460	Timing Pulley - 44Z	37- 17
AB03 0463	Fusing Cam Pulley	67- 23
AB03 0464	Timing Pulley - 30Z	71- 25
AB03 0465	Timing Pulley - 25Z	71- 9
AB03 0466	Timing Pulley - 20Z	17- 14
AB03 0466	Timing Pulley - 20Z	31- 19
AB03 0473	End Fence Pulley - 22Z	65- 11
AB03 0474	Pulley - 24Z	63- 5
AB03 0475	Pulley - 18Z S2M	59- 13
AB03 2717	Pulley - 26Z	33- 1
AB03 2717	Pulley - 26Z	37- 7
AB03 2718	Drive Pulley	37- 20
AB04 0015	Spring Clutch - Tray Bottom Plate	63- 35
AC01 5020	Toner Shield Glass	39- 5
AC02 0090	Cylindrical Lens	39- 14
AC03 0073	1st Mirror	33- 9
AC03 0074	2nd Mirror	33- 7
AC03 0080	1st Mirror	39- 10
AC06 0002	White Plate	103- 9
AD00 4075	Charge Corona Unit	41- 20
AD02 0053	Charge Corona Wire	41- 8
AD02 1109	Receptacle - Charger	83- 13
AD02 2283	Front End Block	41- 1
AD02 2285	Rear End Block	41- 3
AD02 2306	Cover - Front End Block	41- 12
AD02 2307	Cover - Rear End Block	41- 6
AD02 3106	Charge Corona Casing	41- 2
AD02 5020	Pick-off Pawl	51- 10
AD03 7043	Development Auger	47- 3
AD04 2029	Cleaning Roller	51- 17
AD04 3033	Toner Collection Coil	51- 16

Part No.	Description	Page and Index No.
AE01 1036	Hot Roller	55- 19
AE02 0055	Pressure Roller	57- 6
AE03 0021	Bushing - 30x42x27	55- 18
AE03 0022	Bearing - 12x24x64m	57- 5
AE03 2018	Bushing - 25x30x9	55- 23
AE04 2009	Cleaning Roller	57- 14
AE04 4013	Hot Roller Stripper	55- 13
AF01 0018	Duplex Tray	61- 18
AF01 0018	Duplex Tray	65- 31
AF01 0066	Paper Tray	15- 8
AF01 3003	Bottom Plate Pad - Duplex	65- 2
AF01 3014	Bottom Plate Pad	15- 9
AF01 5027	Paper Size Slider	15- 13
AF01 6080	Front Side Fence	15- 3
AF01 6081	Rear Side Fence	15- 11
AF01 6160	Rear Side Fence	65- 3
AF01 6161	Front Side Fence	65- 4
AF01 7012	End Fence	15- 7
AF01 7014	End Fence	65- 29
AF02 0316	Lower Registration Roller	31- 10
AF02 0317	Stack Roller	63- 17
AF02 0319	Transport Roller	63- 1
AF02 0320	Right Transport Roller	63- 2
AF02 0321	Paper Feed Drive Roller	31- 20
AF02 0322	Lower Drive Roller - Transport	17- 29
AF02 0326	Exit Roller Ass'y	57- 19
AF02 0327	Exit Roller	59- 8
AF02 0328	Relay Drive Roller	59- 12
AF02 0329	Relay Roller	17- 32
AF02 0330	Vertical Driven Roller	29- 22
AF02 0364	Driven Roller	21- 6
AF02 0365	Transport Roller	21- 1
AF02 1052	Upper Registration Roller	31- 9
AF02 2077	Driven Roller	61- 7

Part No.	Description	Page and Index No
AF02 2077	Driven Roller	63- 19
AF02 5023	Exit Pick-off Pawl	59- 9
AF03 0025	Pick-up Feed Roller	17- 3
AF03 0031	Pick-up Roller	23- 16
AF03 1024	Feed Roller	63- 20
AF03 1026	Paper Feed Roller	17- 39
AF03 1031	Feed Roller	23- 17
AF03 2026	Separation Roller	63- 31
AF03 2027	Separation Roller	17- 25
AF03 2031	Separation Roller	21- 16
AF04 0031	Upper Exit Roller	59- 2
AF04 0031	Upper Exit Roller	61- 11
AF04 0548	Exit Driven Roller	57- 17
AF04 3069	Copy Tray	85- 1
AF04 3076	Copy Tray Slide	85- 2
AF04 3077	Copy Tray Guide	85- 3
AG05 0074	Registration Knob	31- 6
AG05 0075	Middle Knob	31- 7
AG05 0076	Fusing Knob	57- 4
AG05 1113	Handle - Transfer Unit	81- 26
AG07 0004	Magnetic Catch	11- 23
AG07 0004	Magnetic Catch	27- 16
AG07 0004	Magnetic Catch	29- 3
AG07 0004	Magnetic Catch	43- 18
AG07 0004	Magnetic Catch	59- 16
AG07 0004	Magnetic Catch	77- 9
AG07 0009	Magnetic Catch	57- 18
AH01 0007	Rubber Foot	81- 20
AW01 0040	Original Sensor	35- 15
AW01 0065	Auto Response Sensor	11- 25
AW01 0072	Original Sensor	35- 11
AW02 0022	Photointerruptor	75- 13
AW02 0068	Photointerruptor	31- 12
AW02 0069	Photointerruptor	29- 20

Part No.	Description	Page and Index No.
AW02 0071	Photointerruptor - Actuator	59- 6
AW02 0072	Photointerruptor	35- 16
AW02 0075	Photointerrupter	17- 8
AW02 0075	Photointerrupter	23- 24
AW02 0075	Photointerrupter	27- 7
AW02 0075	Photointerrupter	63- 7
AW02 0075	Photointerrupter	65- 18
AW02 0075	Photointerrupter	69- 26
AW02 0085	Photointerrupter	23- 25
AW03 0051	Optics Fiber - 520mm	73- 18
AW03 0051	Optics Fiber - 520mm	75- 9
AW03 0052	Optics Fiber - 1300mm	73- 2
AW03 0053	Optics Fiber - 860mm	75- 16
AW11 0017	Thermostat - 140C - AC120V 15A	33- 14
AW23 0008	ID Sensor	45- 10
AW31 0004	Toner Detect Sensor	45- 4
AW50 0010	Push Switch	75- 2
AW50 0012	Push Switch	29- 16
AX04 0061	Cleaner Motor - DC 0.5W	41- 27
AX05 0090	Motor - DC 24V 36W	27- 8
AX06 0100	Polygon Mirror Motor	39- 1
AX06 0107	Motor - DC 24W	37- 14
AX07 0009	Motor - DC 63w	67- 2
AX20 0098	Magnetic Clutch - 7kg Cm 35z	71- 24
AX20 0099	Magnetic Clutch - 7kgf.cm 26z	71- 16
AX20 0100	Magnetic Clutch - 3.5kgf Cm 35z	71- 27
AX20 0103	Electrical Spring Clutch	69- 3
AX20 0104	Electrical Spring Clutch	69- 5
AX20 0125	Magnetic Clutch - 0.35n.m - Z35	71- 1
AX20 0126	Magnetic Clutch - 0.25n.m - Z42	71- 29
AX21 0046	Electrical Spring Clutch	69- 27
AX31 0022	Total Counter	77- 5
AX40 0057	Heater - 115V 9W	35- 14
AX40 0058	Heater - 230V 9W	35- 14

Part No.	Description	Page and Index No
AX40 0066	Heater - 120V 9W	81- 8
AX40 0067	Heater - 230V 9W	81- 8
AX44 0088	Fusing Lamp - 120V 790W (115V)	55- 21
AX44 0089	Fusing Lamp - 230V 790W (230V)	55- 21
AX50 0051	Quenching Lamp	83- 4
AX52 0021	Scanner Lamp - 75V 200W	33- 10
AX64 0053	Fan Motor - DC 1.44W	83- 3
AX64 0054	Fan Motor - DC 2.4W	75- 22
AX64 0060	Fan Motor - DC 0.96W	35- 9
AX65 0015	Fan Motor - DC 5.8W	37- 1
AZ00 0013	Power Supply Cord - (115V)	75- 19
AZ23 0052	Lamp Stabilizer (115V)	73- 17
AZ23 0062	Lamp Stabilizer (230V)	73- 17
AZ24 0028	DC Supply Board (115V)	73- 15
AZ24 0031	DC Supply Board (230V)	73- 15
AZ30 0039	Power Pack - Development	45- 7
AZ30 0040	Power Pack - Transfer Unit	53- 18
AZ32 0073	Power Pack - Charge	73- 6
C225 2867	Decal - Cover - Panel - Nashua	11- 2
C225 2867	Decal - Cover - Panel - Nashua	101- 12
G011 3305	Gear - 16T	19- 13
G011 3305	Gear - 16T	65- 8

Part No.	Description	Page and Index No.
A006 9104	Scanner Positioning Pin (4 pcs/set)	103- 1
A048 2838	Nylon Rivet	15- 10
A053 1957	Flex Hinge - Platen Cover	13- 4
A060 3826	Toner Collection Bottle Roller	81- 22
A060 3827	Roller Holder	81- 28
A069 1883	Shoe - Scanner	33- 4
A069 5352	Ground Wire - Scanner	37- 13
A079 3054	Seal - 3x5x8mm	53- 33
A079 3626	Stepped Screw - Swing Cleaning	63- 47
A096 1873	Scanner Shoe Pin	33- 13
A096 2051	Rear Grid Anchor	41- 7
A096 2052	Front Grid Anchor	41- 14
A096 2053	Cleaner Motor Cover	41- 25
A096 2054	Grounding Plate	41- 35
A096 2055	Motor Grounding Plate	41- 36
A096 2057	Charge Corona Grid	41- 9
A096 2061	Screw Shaft	41- 31
A096 2062	Wire Cleaner Slider	41- 30
A096 2063	Corona Wire Cleaner	41- 33
A096 2065	Slider Ring	41- 32
A096 2330	Drum Shaft Knob	49- 3
A096 3575	Blade Release Lever	49- 5
A096 3646	Pick-off Pawl Shaft	51- 13
A096 6266	Tray Lock Arm	81- 3
A096 6353	Feed Roller Lever	23- 21
A097 6000	Separation Torque Limitter	21- 15
A100 1310	Platen Cover Hinge Ass'y	13- 8
A100 1324	Positioning Sensor Shutter	13- 7
A100 1325	Hinge Spacer	13- 9
A100 2056	Plate - Cylindrical Lens	39- 15
A100 5406	IC - Analog Prosessing	91- 1
A130 1175	Main Corona Duct	75- 6
A130 1359	Small Inner Cover	11- 29
A130 1815	Lens Block Ass'y	35- 13

Part No.	Description	Page and Index No
A130 9005	Exposure Glasse With Electoric Conductor Coati	103- 7
A130 9006	Grounding Plate - Exposure Glass	103- 8
A134 1063	Transfer Unit Bracket	81- 18
A134 1065	Fusing Connector Bracket	75- 10
A134 1071	Left Grip Plate	77- 19
A134 1071	Left Grip Plate	79- 9
A134 1072	Right Bracket - Grip Plate	77- 20
A134 1072	Right Bracket - Grip Plate	79- 11
A134 1073	Left Bracket - Grip Plate	77- 21
A134 1073	Left Bracket - Grip Plate	79- 10
A134 1076	Left Stay - Exposure Unit	83- 1
A134 1080	Right Stay - Exposure Unit	83- 8
A134 1081	Transfer Unit Stay	81- 15
A134 1083	Paper Feed Stay	81- 23
A134 1084	Drum Heater Cover	81- 21
A134 1092	Lamp Stabilizer Stay	59- 11
A134 1096	Left Bracket - ADF	75- 12
A134 1098	Positioning Sensor Bracket	75- 14
A134 1099	Right Bracket - ADF	75- 7
A134 1102	Belt Tension Bracket A'ssy	69- 14
A134 1105	Arm - Tightener	67- 10
A134 1105	Arm - Tightener	69- 13
A134 1109	Tightner Bracket - Paper Feed	69- 24
A134 1109	Tightner Bracket - Paper Feed	71- 15
A134 1114	Drum Holder	69- 19
A134 1121	Joint Gear	67- 17
A134 1126	Bracket - Cleaning Drive	69- 15
A134 1135	Fly Wheel	69- 32
A134 1150	Tension Bracket - Fusing Drive	67- 14
A134 1154	Release Lever - Fusing Drive	67- 13
A134 1161	Cooling Fan Duct	83- 15
A134 1164	Cooling Fan Bracket	83- 2
A134 1173	Exhaust Fan Motor-DC, 2.88W	75- 1
A134 1190	Exhaust Fan Duct	75- 21

Part No.	Description	Page and Index No.
A134 1192	Seal - Fan Motor	83- 14
A134 1195	Seal - Fan Harness	83- 17
A134 1282	Rear Cover	11- 12
A134 1292	Bracket - Upper Cover	75- 24
A134 1302	Upper Cover	11- 5
A134 1317	Hinge - Front Cover	11- 21
A134 1318	Side Bracket - Front Cover	77- 10
A134 1319	Middle Bracket - Front Cover	77- 16
A134 1345	Rear Cover Bracket	79- 6
A134 1352	Right Inner Cover	11- 18
A134 1354	Middle Inner Cover	11- 19
A134 1357	Left Inner Cover	11- 22
A134 1362	Right Upper Cover	11- 13
A134 1369	Seal - Front Upper Cover	11- 32
A134 1377	Cap - Front Upper Cover	11- 27
A134 1383	Emblem (RIC)	11- 24
A134 1385	Misfed Removal Sheet	11- 28
A134 1392	Platen Cover Ass'y	13- 12
A134 1394	Front Platen Cover	13- 3
A134 1395	Rear Platen Cover	13- 5
A134 1396	Original Holder	13- 6
A134 1662	Polygon Motor Cover	37- 3
A134 1664	LD Unit Cover (115V)	37- 4
A134 1675	Front Scanner Frame	37- 25
A134 1677	Front Tension Bracket	37- 6
A134 1678	Rear Tension Bracket	37- 23
A134 1679	Rear Scanner Frame	37- 26
A134 1680	Guide - Flexible Harness	37- 19
A134 1698	Idle Pulley	37- 24
A134 1720	Bracket - Scanner Motor	37- 10
A134 1722	Bracket - Drive Shaft	37- 18
A134 1724	Cushion - Stepper Motor	37- 11
A134 1726	Wire Stopper Plate	33- 12
A134 1728	Fly Wheel	37- 15

Part No.	Description	Page and Index No
A134 1776	Spring Plate - 1st Mirror	33- 8
A134 1782	2nd Scanner Ass'y	33- 6
A134 1791	Spring Plate - 2nd Mirror	33- 3
A134 1922	Rear Scale (A4)	11- 7
A134 1923	Left Scale (A4)	11- 9
A134 1924	Exposure Glass	11- 11
A134 1926	Exposure Glass Stopper	33- 15
A134 1929	Bracket - Left Scale	33- 18
A134 1932	Stay - Scanner Upper Right	33- 20
A134 1933	Right Stopper - Exposure Glass	33- 19
A134 1955	Inner Cover - Scanner	35- 7
A134 1959	Bracket - Exhaust Fan	37- 2
A134 1962	Bracket Home Sensor	35- 8
A134 1964	Bracket - Flexible Harness	37- 8
A134 1966	Drive Board - Scanne Motor	73- 16
A134 1971	Bracket - Fan Motor	35- 10
A134 2071	Bracket - 1st Mirror	39- 11
A134 2073	Right Btl Bracket	39- 7
A134 2074	Left Btl Bracket	39- 9
A134 2079	Btl Lens	39- 8
A134 2083	Guide Plate - Toner Shield Glass	39- 13
A134 2085	LD Unit (115V)	39- 3
A134 2129	Bracket - Mirror	39- 16
A134 2252	Front Drum Plate	49- 2
A134 2255	Rear Drum Plate	49- 14
A134 2259	Right Drum Stay	49- 9
A134 2268	Front Drun Stand	49- 1
A134 2269	Positioning Plate - Pick-off Pawl	51- 7
A134 2271	Bracket - Cleaning Blade	49- 11
A134 2275	Cleaning Blade	49- 8
A134 2277	Drive Shaft - Cleaning Roller	51- 18
A134 2278	Joint Gear - Cleaning	51- 5
A134 2278	Joint Gear - Cleaning	69- 23
A134 2284	Cleaning Case Cover	51- 1

Part No.	Description	Page and Index No.
A134 2300	Bushing - Drum	49- 4
A134 2332	Absorb Duct	83- 5
A134 2334	Middle Exhaust Duct	83- 7
A134 2344	Harness Bracket	77- 7
A134 2346	Drum Guide Stay - Left	83- 16
A134 2358	Drum Shaft	69- 20
A134 2363	Terminal Plate	41- 13
A134 2370	Cam - Toner Collection Bottle	67- 20
A134 2374	Right Stay - Collection Bottle	81- 16
A134 2375	Left Stay - Collection Bottle	81- 13
A134 2380	Toner Collection Bottle Cap	41- 15
A134 2382	Upper Sponge - Collection Bottle	41- 18
A134 2383	Lower Sponge - Collection Bottle	41- 19
A134 2384	Toner Overflow Sensor Ass'y	41- 23
A134 2387	Cap - Spring	41- 16
A134 2391	Front Drum Seal	49- 12
A134 2392	Rear Drum Seal	49- 13
A134 2553	Lower Registration Guide	31- 15
A134 2557	Regist Sensor Bracket	31- 11
A134 2558	Upper Guide Plate - Registration	31- 14
A134 2570	Stopper Bracket - Registration	71- 17
A134 2572	Middle Tightener	71- 10
A134 2574	Flange - Gear	67- 6
A134 2574	Flange - Gear	71- 6
A134 2575	Tightener Arm	71- 21
A134 2577	Upper Support Bracket - Paper Feed	71- 20
A134 2579	Stopper Bracket	71- 18
A134 2582	Sensor Bracket - Vertical Transfer	31- 24
A134 2585	Vertical Transfer Guide Plate	29- 2
A134 2588	Paper Guide	29- 1
A134 2671	Left Guide Plate - By-pass Feed	21- 3
A134 2701	By-pass Feed Guide	19- 8
A134 2705	Magnet Catch Plate	19- 10
A134 2706	Rear Fence Rack	19- 12

Part No.	Description	Page and Index No
A134 2707	Front Fence Rack	19- 14
A134 2711	Front Side Fence	19- 5
A134 2716	Rear Side Fence	19- 7
A134 2721	Front Paper Guide	19- 4
A134 2726	Rear Paper Guide	19- 6
A134 2741	By-pass Feed Entrance Guide	19- 3
A134 2746	By-pass Feed Cover	19- 15
A134 2790	Reverse Stay	17- 26
A134 2795	Pressure Lever	17- 27
A134 2810	Release Solenoid	17- 31
A134 2821	Front Side Plate	17- 38
A134 2826	Rear Side Plate	17- 15
A134 2830	Drive Shaft	17- 21
A134 2832	Driven Shaft Ass'y	17- 23
A134 2834	Vertical Transport Guide	17- 35
A134 2839	Reverse Gide Plate	17- 1
A134 2846	Lower Guide Plate	17- 37
A134 2855	Lower Feed Stay	17- 16
A134 2860	Pick-up Arm	17- 5
A134 2862	Paper End Sensor Feeler	17- 17
A134 2863	Paper End Sensor Lever	17- 19
A134 2866	Pick-up Solenoid	17- 11
A134 2868	Solenoid Bracket	17- 40
A134 2873	Positioning Sensor Bracket	17- 9
A134 2878	Paper End Sensor Bracket	17- 7
A134 2885	Torque Limitter	17- 24
A134 2895	Vertical Relay Guide	31- 23
A134 2900	Duplex Stay	31- 17
A134 2903	Upper Guide Plate - Duplex Feed	31- 21
A134 2904	Lower Guide Plate - Duplex Feed	31- 22
A134 2921	Left Slide Rail	81- 1
A134 2926	Paper Feed Lock Bracket	81- 2
A134 2930	Right Slide Rail	81- 25
A134 2933	Tray Lift Motor - DC24V 0.5W	75- 23

Part No.	Description	Page and Index No.
A134 2941	Bracket - Paper Sizesensor	75- 3
A134 2947	Heater Cover	81- 7
A134 2956	Paper Feed Front Cover	15- 1
A134 2956	Paper Feed Front Cover	61- 1
A134 2966	Bottom Lift Shaft	15- 17
A134 2967	Bottom Lift Lever	15- 16
A134 2968	Grounding Plate	15- 15
A134 2976	Stopper Lever	15- 4
A134 2978	Spring Plate	15- 5
A134 2986	Bottom Plate	15- 18
A134 2997	Decal - Paper Setting	15- 2
A134 2997	Decal - Paper Setting	101- 3
A134 3051	Development Unit	45- 16
A134 3055	Front Seal - Development Roller	45- 18
A134 3056	Rear Seal - Development Roller	45- 17
A134 3060	Entrance Seal - Development	45- 6
A134 3086	Fixing Plate - Development	47- 7
A134 3088	Cover - Power Pack	45- 8
A134 3090	Development Filter	45- 5
A134 3095	Front Cover - Development	45- 9
A134 3120	Toner Supply Unit	45- 1
A134 3145	Disk - Torque Limiter	45- 13
A134 3157	Bottle Holder Bracket	43- 19
A134 3161	Bottle Drive Bracket	43- 14
A134 3162	Bottle Drive Motor DC 5.85w	43- 20
A134 3164	Bracket - Toner Holder	43- 17
A134 3171	Shutter - Toner Bottle	43- 16
A134 3172	Toner Bottle Holder	43- 13
A134 3177	Toner Slider	43- 4
A134 3179	Chuck Shaft	43- 7
A134 3180	Bottle Chuck	43- 3
A134 3181	Chuck Roller	43- 6
A134 3185	Gear - Toner Bottle (RIC - 230V)	43- 1
A134 3190	Toner Bottle Stopper	43- 9

Part No.	Description	Page and Index No
A134 3197	Bottle Holder	43- 12
A134 3201	Cam - Toner Bottle	77- 12
A134 3203	Shutter Bracket - Toner Holder	77- 11
A134 3212	Toner Receive Plate	43- 23
A134 3227	Positioning Holder - Development	83- 11
A134 3229	Stopper - Development Unit	83- 18
A134 3236	Support Bracket - Development Drive	69- 12
A134 3237	Support Bracket - Clutch	69- 4
A134 3240	Relay Shaft	69- 9
A134 3244	Bracket - Development Drive	69- 6
A134 3850	Transfer Belt	53- 1
A134 3854	Frame - Transfer Unit	53- 3
A134 3856	Side Plate Drive Roller	53- 7
A134 3860	Terminal Plate - Bias Roller	53- 11
A134 3865	Bushing - Driver Roller	53- 12
A134 3872	Drive Roller - Transfer	53- 2
A134 3875	Driven Roller Transfer	53- 13
A134 3880	Bias Roller - Transfer	53- 4
A134 3891	Bushing - Drive Roller	53- 9
A134 3903	Casing - Transfer Belt	53- 31
A134 3908	Seal - Power Pack - Transfer	53- 19
A134 3912	Release Stay	53- 26
A134 3914	Front Release Lever	53- 24
A134 3915	Rear Release Lever	53- 20
A134 3934	Stay - Transfer Belt Cleaning	53- 27
A134 3935	Lever - Transfer Belt Cleaning	53- 15
A134 3937	Bushing - Belt Cleaning	53- 28
A134 3940	Cleaning Blade - Transfer Belt	53- 29
A134 3960	Toner Collection Coil - Transfer	53- 34
A134 3975	Paper Guide Stay	81- 5
A134 3980	Stay - Transfer Unit Handle	81- 17
A134 3998	Supporter - Transfer Unit	53- 14
A134 4006	Fusing Exit Unit	57- 1
A134 4050	Fusing Cover	55- 2

Part No.	Description	Page and Index No.
A134 4061	Rear Terminal Plate	55- 7
A134 4063	Bias Plate - Thermofuse	55- 6
A134 4075	Front Bracket - Fusing Lamp	55- 4
A134 4084	Connector Bracket - Fusing	55- 15
A134 4085	Terminal Plate - Fusing	55- 17
A134 4102	Fusing Lamp Holder - Front	55- 5
A134 4103	Fusing Lamp Holder - Rear	55- 14
A134 4130	Fusing Front Cover	55- 1
A134 4153	Slide Rail - Fusing	57- 11
A134 4161	Pressure Lever	57- 8
A134 4195	Fusing Entrance Guide	57- 10
A134 4201	Cleaning Roller Bracket	57- 13
A134 4280	Fusing Exit Guide - Lower	57- 16
A134 4301	Exit Guide Hinge	57- 7
A134 4351	Stay - Fusing Rail	81- 12
A134 4352	Fusing Lock Lever	81- 9
A134 4355	Fusing Unit Stopper	81- 14
A134 4450	Upper Exit Guide	59- 3
A134 4453	Roller Holder	59- 25
A134 4455	Upper Guide Bracket	59- 19
A134 4456	Bracket - Exit Sensor	59- 5
A134 4458	Exit Unit Knob	59- 17
A134 4460	Turn Gate - Right Upper Ass'y	59- 15
A134 4464	Left Reverse Guide	59- 1
A134 4465	Turn Guide - Right Lower	59- 14
A134 4467	Left Bracket - Turn Gate	59- 21
A134 4468	Lower Guide Plate	59- 20
A134 4471	Stripper Solenoid	59- 22
A134 4481	Tightener Bracket	67- 27
A134 4508	Inverter Guide Plate	63- 24
A134 4512	Feed Roller Shaft	63- 22
A134 4525	End Fence Ass'y	65- 26
A134 4619	Guide Plate Link	61- 12
A134 4620	Grounding Plate	65- 19

Part No.	Description	Page and Index No
A134 4646	Separation Roller Shaft	63- 30
A134 4649	Paper Guide Holder	63- 18
A134 4654	Bottom Pressure Plate	65- 5
A134 4658	Vibrating Plate	63- 26
A134 4662	Duplex Guide Plate	63- 25
A134 4671	Bracket - Separation Roller	63- 29
A134 4676	Paper End Feeler	63- 3
A134 4688	Front Side Fence Rack	65- 10
A134 4689	Rear Side Fence Rack	65- 9
A134 4690	Clutch Stopper	63- 43
A134 4701	Front Upper Cover	61- 3
A134 4710	End Fence Actuator	65- 24
A134 4712	Right Cover Bracket	63- 46
A134 4714	Tightener	65- 15
A134 4720	End Fence Upper Cover	61- 2
A134 4721	Connector Cover	61- 4
A134 4726	Guide Plate Knob	61- 9
A134 4728	Inverter Feeler	61- 5
A134 4730	Entrance Feeler	61- 14
A134 4732	Upper Guide Plate	61- 6
A134 4739	Lower Guide Plate Knob	61- 10
A134 4740	Lower Guide Plate	61- 15
A134 4751	Front Side Plate	63- 44
A134 4765	Grounding Plate	63- 6
A134 4781	Rear Side Plate	63- 12
A134 4790	Paper End Sensor	63- 11
A134 4799	Motor Bracket	63- 42
A134 4800	Motor Bracket	63- 41
A134 4804	Guide Plate Stopper	63- 10
A134 4808	Rear Guide Holder	63- 21
A134 4809	Front Guide Holder	63- 16
A134 4884	Decal - Duplex Misfeed Removal	61- 21
A134 4884	Decal - Duplex Misfeed Removal	101- 4
A134 4901	Duplex Right Rail	81- 24

Part No.	Description	Page and Index No.
A134 5109	IC - JSL38G519ANO5	89- 3
A134 5119	IC - TC160G22AF-1024 (NRG)	87- 1
A134 5127	IC - HD6433278A44P10	89- 2
A134 5190	LSD Board	39- 4
A134 5210	IC - D302102	91- 5
A134 5212	IC - M66349AFP	91- 6
A134 5214	IC - NG62GO14R38F	91- 7
A134 5215	IC - RF5GV94	91- 8
A134 5216	IC - RS5C267	91- 8
A134 5218	IC - UPD65641GJ-PO1-3EN	91- 9
A134 5219	IC - RF5C245A	91- 10
A134 5241	Power Pack	77- 18
A134 5251	ID Sensor	51- 3
A134 5254	Duplex Control Board	65- 23
A134 5265	Thermofuse	55- 10
A134 5266	Thermistor	55- 9
A134 5282	Paper Size Sensor Board	19- 11
A134 5290	Transport Drive Motor	63- 40
A134 5291	Jogger Drive Motor DC 6.48W	65- 20
A134 5292	Jogger Drive Motor DC 10.56W	65- 21
A134 5300	Fusing Harness - 115V	55- 16
A134 5306	Harness - Development Unit	45- 11
A134 5310	Harness - ID Sensor	51- 2
A134 5315	Relay Harness - Lower Paper Feed	17- 36
A134 5319	Harness - Duplex Unit	75- 26
A134 5320	Duplex Main Harness	65- 30
A134 5321	Sensor Relay Harness	65- 32
A134 5322	End Fence Harness	65- 25
A134 5323	Motor Harness	65- 22
A134 5360	Harness - Scanner Lamp	33- 5
A134 5370	Relay Harness - Scanner Lamp	33- 16
A134 5391	Harness - LSD	39- 6
A134 5396	Harness - LD Unit (115V)	35- 3
A134 5396	Harness LD Unit (115V)	35- 5

Part No.	Description	Page and Index No
A134 5472	Relay Harness - Regist.Sensor	31- 13
A134 5476	Scanner Harness - Rear Left	35- 4
A134 5478	Scanner Harness - Front	35- 2
A134 5479	Harness - Exit Sensor	59- 7
A134 5491	Relay Harness - Polygon Motor	39- 2
A134 5811	Bracket - Power Cord	75- 17
A134 5813	Bracket - AC Drive Board	73- 8
A134 5817	Right Lower Bracket - DC Supply	79- 8
A134 5818	Left Lower Bracket - DC Supply	79- 7
A134 5819	Left Upper Bracket - DC Supply	67- 3
A134 5820	Bracket - Harness Clamp	69- 25
A134 5823	Arm - Interlock Switch	77- 2
A134 5824	Bracket - Power Pack	77- 15
A134 5825	Rear Bracket - Power Pack	83- 10
A134 5826	Bracket - Total Counter	77- 6
A134 5827	Short Bracket - Main Harness	75- 8
A134 5828	Long Bracket - Main Harness	67- 1
A134 5829	Bracket - Charge Power Pack	73- 7
A134 5831	Bracket - BCU	73- 14
A134 5833	Lower Bracket - SCU	79- 4
A134 5834	Bracket - SCU	73- 5
A134 5834	Bracket - SCU	79- 5
A134 9011	Charge Corona Unit	41- 24
A134 9011	Charge Corona Unit With Cleaner	103- 6
A153 1380	Platen Cover Bracket	13- 10
A153 2991	Front Side Fence Guide	15- 6
A153 2992	Rear Side Fence Guide	15- 12
A153 4112	Stripper Bracket	55- 11
A153 5671	Power Supply Cord (230V)	75- 19
A153 6406	Model Name Plate - GER	101- 10
A153 6409	Decal - Keytop Cover (NRG-EU)	11- 1
A153 6409	Decal - Keytop Cover (NRG-EU)	101- 12
A153 6423	Support Cover (INF)	11- 24
A154 4616	Paper Holder (RIC)	61- 17

Part No.	Description	Page and Index No.
A154 4618	Bracket - Socket	75- 4
A154 4618	Bracket Socket	75- 25
A154 4620	Bottom Plate	65- 1
A155 5165	LCT Main Board	27- 18
A155 5170	Push Switch	27- 27
A155 5348	Paper End Sensor Harness	27- 4
A155 6101	LCT Upper Cover	25- 6
A155 6110	Front Side Plate - LCT	27- 29
A155 6113	Decal - Paper Set	25- 2
A155 6113	Decal - Paper Set	101- 5
A155 6114	Dautions Decal - LCT	25- 31
A155 6114	Caution Decal - LCT	101- 7
A155 6116	Safety Switch Bracket	27- 21
A155 6117	Safety Switch Lever	27- 23
A155 6118	Spring Plate	27- 20
A155 6125	Rear Side Bracket	27- 28
A155 6136	Lift Sensor Bracket	27- 11
A155 6141	Tray Bottom Plate	27- 17
A155 6142	LCT Paper Tray	25- 14
A155 6143	Left Bracket	27- 1
A155 6145	Tray Cover	27- 19
A155 6147	Paper End Sensor Bracket	27- 3
A155 6148	Paper End Sensor Feeler	27- 2
A155 6153	Upper Hinge	27- 6
A155 6169	Hinge Holder	25- 30
A155 6170	Hinge Bracket	25- 21
A155 6171	Grip Bracket	25- 19
A155 6181	Knob	25- 18
A155 6203	Paper Tray Stay	27- 5
A155 6207	Cover Bracket	25- 3
A155 6215	Harness Guide	27- 30
A155 6221	LCT Rear Cover	25- 15
A155 6231	LCT Right Cover	25- 16
A155 6241	LCT Harness Cover	11- 15

Part No.	Description	Page and Index No
A155 6302	Hinge Angle	25- 5
A155 6306	Front Side Fence	25- 22
A155 6307	Rear Side Fence	25- 12
A155 6311	Front Paper Holder	25- 23
A155 6312	Rear Paper Holder	25- 10
A155 6313	Support Guide	25- 11
A155 6321	Front Spring Plate	25- 24
A155 6322	Rear Sprig Plate	25- 25
A300 3155	Stepped Screw - M25x32	27- 22
A334 4706	Disk - Bottom Plate Clutch	63- 36
A335 3251	Top Cover Hinge	25- 4
A335 3251	Top Cover Hinge	25- 7
A335 4351	Guide Roller	27- 10
A335 4352	Timing Belt Clamp	27- 25
A352 2138	Slide Collar - 0.6x4.5x6	51- 11
A406 9505	Platen Cover Sheet - 10 Sheet/1 Set	13- 1
A421 2543	Friction Pad	25- 13
A469 2123	Rubber Cushion - 1x10x10mm	23- 22
A470 1703	Shift Clutch	59- 23
A470 1704	Spring - Lower Exit Roller	59- 24
A491 4690	Bottom Plate Hook	65- 7
A540 5171	IC - HD6473298P6 OTP	91- 11
A540 5201	IC - M65791FP FBTC	91- 12
A540 5203	IC - UPD65622 GAFVR	91- 13
A614 5101	IC - UVEPROM 4M X16 150NS (NRG EU)	73- 19
A614 5101	IC - UVEPROM 4MX16 150NS (NRG)	87- 2
A614 5102	IC - UVEPROM 4M X16 150NS (NRG EU)	73- 20
A614 5102	IC - UVEPROM 4MX16 150NS (NRG)	87- 3
A614 5103	IC - UVEPROM 4M X16 150NS (NRG EU)	73- 21
A614 5103	IC - UVEPROM 4MX16 150NS	87- 4
A615 4453	Side Plate : Risning Tray : Front	85- 8
A615 4455	Bracket : Paper Ext Sup	85- 9
A615 4457	Oil Dumper - 0.05 NFM	85- 15
A615 4463	Rear Side Plate - Copy Tray Holder	85- 10

Part No.	Description	Page and Index No.
A615 4465	Rear Side Plate	85- 16
A615 4472	Upper Stay	85- 11
A615 4473	Lower Stay	85- 12
A615 4474	Copy Tray Holder	85- 13
A615 4480	Cover - Copy Tray	85- 14
5013 0815	Pressuer Spring	67- 8
5053 0223	Bushing - 8mm	27- 26
5053 0223	Bushing - 8mm	71- 19
5203 1686	Screw - Slid Rail	57- 12
5203 1686	Screw - Slid Rail	81- 11
5203 9501	Silicone Grease G-501	103- 4
5205 2612	Gear - 19T	53- 22
5206 2686	Snap Ring	61- 8
5215 2621	Snap Ring - M6	19- 16
5215 2621	Snap Ring - M6	63- 15
5215 2621	Snap Ring - M6	81- 19
5215 3872	Gear - 45T	67- 22
5215 4497	Exit Antistatic Brush	59- 26
5219 1958	Spring - Lens Guide	53- 25
5304 1639	Bushing - 8mm	63- 14
5324 1658	Bushing- 4x8x4.5mm	51- 9
5408 5160	Short Connector	77- 8
5414 4630	Bottle Spring	67- 28
5420 9507	Digital Multimeter	103- 5
5420 9516	Test Chart - OS-A3 (10 pcs/set)	103- 2
5442 4467	Spring - Stripper Pawl Plate	77- 3
5442 4467	Spring - Stripper Pawl Plate	81- 10
5443 2668	Bushing - 4x6x7mm	63- 8
5446 1239	Plate Nut - Key Counter	29- 9
5446 3108	Spacer - 1.5x4.2x11mm	45- 15
5447 2681	Snap Ring	17- 2
5447 2681	Snap Ring	21- 10
5447 2681	Snap Ring	23- 23
5447 2681	Snap Ring	29- 24

Part No.	Description	Page and Index No
5447 2681	Snap Ring	63- 37
5447 2706	Gear - 15T	17- 4
5447 2706	Gear - 15T	23- 15
5447 2768	Stepped Screw - M3	61- 13
5447 2927	Friction Pad - B	19- 2
5447 9078	Heat Resistant Grease - MT-78	103- 3
5474 2152	Bushing - 8x12x12mm	31- 4
5853 1190	Spring - Click Plate	49- 7
5875 2088	Shoulder Screw - M4	53- 23
5875 2088	Shoulder Screw - M4	77- 14
5921 3104	Spring - Toner End Lever	23- 19
5925 2258	Stopper Chain	27- 13

Part No.	Description	Page and Index No.
0313 0040B	Philips Pan Head Screw - M3x4	23-101
0313 0040B	Philips Pan Head Screw - M3x4	31-105
0313 0040B	Philips Pan Head Screw - M3x4	59-103
0313 0050B	Philips Pan Head Screw - M3x5	63-110
0313 0050B	Philips Pan Head Screw - M3x5	85-103
0313 0080B	Philips Pan Head Screw - M3x8	53-107
0313 0080B	Philips Pan Head Screw - M3x8	55-105
0313 0140B	Philips Pan Head Screw - M3x14	33-101
0313 0350B	Philips Pan Head Screw - M3x35	77-102
0314 0060B	Philips Pan Head Screw - M4x6	49-102
0314 0060B	Philips Pan Head Screw - M4x6	55-103
0314 0060B	Philips Pan Head Screw - M4x6	71-101
0314 0080B	Philips Pan Head Screw - M4x8	37-107
0314 0100B	Philips Pan Head Screw - M4x10	37-102
0314 0100B	Philips Pan Head Screw - M4x10	55-106
0314 0100B	Philips Pan Head Screw - M4x10	69-108
0314 0120B	Philips Pan Head Screw - M4x12	35-101
0314 0120B	Philips Pan Head Screw - M4x12	69-102
0314 0250B	Philips Pan Head Screw - M4x25	35-103
0314 0350B	Philips Pan Head Screw - M4x35	75-111
0323 0060B	Philips Sunk Screw - M3x6	43-107
0323 0060B	Philips Sunk Screw - M3x6	75-110
0323 0080B	Philips Sunk Screw - M3x8	29-107
0324 0080B	Philips Sunken Head Screw - M4x8	11-102
0344 0060F	Philips Truss Head Screw - M4x6	15-104
0344 0080F	Philips Truss Head Screw - M4x8	61-101
0353 0040B	Screw - M3X4	33-103
0353 0060B	Philips Pan Head Screw - M3x6	45-104
0353 0080B	Screw - M3x8	35-110
0353 0080B	Screw - M3X8	37-109
0353 0300B	Bind Screw - M3x30	77-107
0353 0300B	Bind Screw - M3x30	83-104
0354 0080B	Screw - M4x8	35-111
0414 0060B	Tapping Screw - M4x6	35-102

Part No.	Description	Page and Index No
0414 0060B	Tapping Screw - M4x6	75-106
0414 0060B	Tapping Screw - M4x6	83-101
0414 0080B	Binding Self-tapping Screw - M4x8	21-105
0414 0080B	Binding Self-tapping Screw - M4x8	29-108
0414 0080B	Binding Self-tapping Screw - M4x8	31-104
0414 0080B	Binding Self-tapping Screw - M4x8	53-101
0414 0080B	Binding Self-tapping Screw - M4x8	69-106
0414 0080B	Binding Self-tapping Screw - M4x8	75-109
0414 0080B	Binding Self-tapping Screw - M4x8	81-103
0414 0142W	Tapping Screw - M4x14	13-101
0414 0352B	Tapping Screw -M4x35	75-103
0434 0060B	Philips Tapping Screw - M4x6	11-103
0434 0060B	Philips Tapping Screw - M4x6	17-101
0434 0060B	Philips Tapping Screw - M4x6	19-102
0434 0060B	Philips Tapping Screw - M4x6	21-102
0434 0060B	Philips Tapping Screw - M4x6	23-102
0434 0060B	Philips Tapping Screw - M4x6	25-101
0434 0060B	Philips Tapping Screw - M4x6	27-101
0434 0060B	Philips Tapping Screw - M4x6	29-101
0434 0060B	Philips Tapping Screw - M4x6	31-107
0434 0060B	Philips Tapping Screw - M4x6	35-105
0434 0060B	Philips Tapping Screw - M4x6	37-108
0434 0060B	Philips Tapping Screw - M4x6	43-101
0434 0060B	Philips Tapping Screw - M4x6	47-103
0434 0060B	Philips Tapping Screw - M4x6	53-102
0434 0060B	Philips Tapping Screw - M4x6	59-107
0434 0060B	Philips Tapping Screw - M4x6	63-109
0434 0060B	Philips Tapping Screw - M4x6	67-102
0434 0060B	Philips Tapping Screw - M4x6	69-103
0434 0060B	Philips Tapping Screw - M4x6	71-102
0434 0060B	Philips Tapping Screw - M4x6	73-110
0434 0060B	Philips Tapping Screw - M4x6	75-104
0434 0060B	Philips Tapping Screw - M4x6	77-106
0434 0060B	Philips Tapping Screw - M4x6	79-102

Part No.	Description	Page and Index No.
0434 0060B	Philips Tapping Screw - M4x6	81-101
0434 0060B	Philips Tapping Screw - M4x6	83-102
0434 0082B	Tapping Screw - M4x8	15-102
0434 0082B	Tapping Screw - M4x8	57-102
0434 0120B	Tapping Screw - M4x12	75-108
0443 0050B	Philips Pan Head Screw - M3x6	49-101
0443 0050B	Philips Pan Head Screw - M3x6	51-105
0443 0060B	Hexagon Tapping Screw - M3x6	27-103
0443 0060B	Hexagon Tapping Screw - M3x6	33-102
0443 0060B	Hexagon Tapping Screw - M3x6	43-103
0443 0060B	Hexagon Tapping Screw - M3x6	47-102
0443 0060B	Hexagon Tapping Screw - M3x6	53-108
0443 0060B	Hexagon Tapping Screw - M3x6	61-104
0443 0060B	Hexagon Tapping Screw - M3x6	63-102
0443 0060B	Hexagon Tapping Screw - M3x6	73-101
0443 0060B	Hexagon Tapping Screw - M3x6	75-102
0443 0060B	Hexagon Tapping Screw - M3x6	79-106
0443 0060W	Hexagon Head Tapping Screw - M3x6	63-111
0443 0080B	Tapping Screw - M3x8	47-104
0443 0080B	Tapping Screw - M3x8	49-103
0443 0122B	Hexagonal Tapping Screw - M3x12	65-106
0443 0140B	Tapping Screw - M3x14	79-108
0451 4006B	Tapping Screw - 4x6	85-101
0534 0040E	Hexagon Headless Set Screw - M4x4	69-114
0575 0050E	Hexagon Headless Set Screw - M5x5	37-101
0623 0160E	Spring Pin - 3x16mm	27-106
0701 0060B	Flat Washer - M6	59-104
0707 8100B	Bushing - M8x10	67-108
0720 0025E	Retaining Ring - M2.5	41-103
0720 0025E	Retaining Ring - M2.5	65-105
0720 0030E	Retaining Ring - M3	17-103
0720 0030E	Retaining Ring - M3	21-103
0720 0030E	Retaining Ring - M3	29-104
0720 0030E	Retaining Ring - M3	51-102

Part No.	Description	Page and Index No
0720 0030E	Retaining Ring - M3	63-105
0720 0030E	Retaining Ring - M3	71-104
0720 0040E	Retaining Ring - M4	17-102
0720 0040E	Retaining Ring - M4	21-104
0720 0040E	Retaining Ring - M4	31-103
0720 0040E	Retaining Ring - M4	43-105
0720 0040E	Retaining Ring - M4	45-103
0720 0040E	Retaining Ring - M4	47-107
0720 0040E	Retaining Ring - M4	53-104
0720 0040E	Retaining Ring - M4	57-104
0720 0040E	Retaining Ring - M4	59-102
0720 0040E	Retaining Ring - M4	63-104
0720 0040E	Retaining Ring - M4	65-103
0720 0040E	Retaining Ring - M4	67-101
0720 0040E	Retaining Ring - M4	69-109
0720 0040E	Retaining Ring - M4	71-106
0720 0040E	Retaining Ring - M4	79-105
0720 0040E	Retaining Ring - M4	81-102
0720 0040E	Retaining Ring - M4	85-102
0720 0060E	Retaining Ring - M6	15-103
0720 0060E	Retaining Ring - M6	17-105
0720 0060E	Retaining Ring - M6	21-101
0720 0060E	Retaining Ring - M6	23-103
0720 0060E	Retaining Ring - M6	27-104
0720 0060E	Retaining Ring - M6	31-101
0720 0060E	Retaining Ring - M6	33-104
0720 0060E	Retaining Ring - M6	37-105
0720 0060E	Retaining Ring - M6	53-103
0720 0060E	Retaining Ring - M6	55-108
0720 0060E	Retaining Ring - M6	63-106
0720 0060E	Retaining Ring - M6	67-107
0720 0060E	Retaining Ring - M6	69-101
0720 0060E	Retaining Ring - M6	71-107
0720 0060E	Retaining Ring - M6	79-104

Part No.	Description	Page and Index No.
0725 0100E	Retaining Ring C - M10	43-102
0725 0120	Retaining Ring C - M12	57-103
0725 0120E	Retaining Ring C - M12	53-106
0725 0120W	Retaining Ring - M12	69-113
0725 0250E	Retaining Ring C - M25	55-107
0740 3008	Ball Bearing - 8x22x7	69-104
0742 3808	Ball Bearing - 8x16x5	17-106
0742 3808M	Bushing - 8x16x5	79-103
0800 0072	Philips Pan Head Screw - M2.6x4	43-108
0801 0149	Philips Pan Head Screw - M4x6	75-114
0801 0150	Philips Tapping Screw W/W - M4x8	11-104
0801 0153	Bind Screw - M6	79-116
0802 5085	Tapping Screw - M4x8	11-101
0802 5085	Tapping Screw - M4x8	59-105
0802 5094	Tapping Truss Head Screw - M4x8	11-105
0802 5094	Tapping Truss Head Screw - M4x8	25-103
0802 5094	Tapping Truss Head Screw - M4x8	29-105
0802 5231	Tapping Screw - M3x6	43-104
0802 5231	Tapping Screw - M3x6	61-103
0802 5232	Tapping Screw - M3x8	11-106
0802 5232	Tapping Screw - M3x8	39-103
0802 5232	Tapping Screw - M3x8	45-102
0802 5232	Tapping Screw - M3x8	47-105
0802 5232	Tapping Screw - M3x8	51-104
0802 5232	Tapping Screw - M3x8	65-102
0802 5233	Tapping Screw - M3x10	43-106
0802 5236	Tapping Screw - M4x8	21-106
0802 5236	Tapping Screw - M4x8	27-102
0802 5236	Tapping Screw - M4x8	57-101
0802 5236	Tapping Screw - M4x8	59-106
0802 5236	Tapping Screw - M4x8	61-102
0802 5236	Tapping Screw - M4x8	63-101
0802 5236	Tapping Screw - M4x8	65-104
0802 5236	Tapping Screw - M4x8	69-105

Part No.	Description	Page and Index No
0802 5236	Tapping Screw - M4x8	85-104
0802 5237	Binding Self-tapping Screw - M4x10	29-103
0802 5237	Binding Self-tapping Screw - M4x10	31-108
0802 5237	Binding Self-tapping Screw - M4x10	47-106
0802 5237	Binding Self-tapping Screw - M4x10	51-103
0802 5237	Binding Self-tapping Screw - M4x10	59-101
0802 5238	Tapping Screw - M4x12	39-102
0802 5238	Tapping Screw - M4x12	47-101
0802 5246	Screw - M3x5	33-105
0802 5246	Screw - M3x5	35-112
0805 0088	Retaining Ring - M6	17-104
0805 0088	Retaining Ring - M6	43-109
0805 3368	Ball Bearing - 8 X 16 X 5mm	37-103
0805 3385	Bushing - 6mm	63-107
0805 3386	Bushing - 8mm	79-107
0805 3480	Bushing - 6mm	57-106
0805 3480	Bushing - 6mm	59-108
0805 3480	Bushing - 6mm	69-110
0805 3490	Bushing - 5x10x4mm	53-105
0805 3492	Bushing - 8x16x5	79-109
0950 4006M	Philips Screw With Flat Washer-M4x6	55-104
0950 4006M	Philips Screw With Flat Washer-M4x6	75-112
0950 4008B	Philips Screw With Spring Waser - M4x8	57-105
0951 3006B	Philips Screw With Flat Washer-M3x6	31-102
0951 3006B	Philips Screw With Flat Washer-M3x6	65-101
0951 4005B	Philips Screw With Flat Wash.- M4x5	37-104
0951 4006B	Philips Screw With Washer - M4x6	35-106
0951 4006B	Philips Screw With Washer - M4x6	37-106
0951 4006B	Philips Screw With Washer - M4x6	71-105
0951 4006B	Philips Screw With Washer - M4x6	73-105
0951 4006B	Philips Screw With Washer - M4x6	83-103
0951 4008B	Philips Screw With Washer - M4x8	45-101
0951 4008B	Philips Screw With Washer - M4x8	63-103
0951 4008B	Philips Screw With Washer - M4x8	67-106

Part No.	Description	Page and Index No.
0951 4008B	Philips Screw With Washer - M4x8	69-111
0951 4010B	Philips Screw With Washer - M4x10	39-101
0951 4010B	Philips Screw With Washer - M4x10	55-101
0960 3004B	Screw - M3x4	17-107
0960 3004B	Screw - M3x4	79-114
0960 4010B	Philips Flange Screw - M4 X 10	81-104
0965 3006B	Tapping Screw With Flat Washer M3x6	19-101
0965 3008B	Tapping Screw With Washer - M3x8	41-102
0965 4008B	Tapping Screw - M4 X 8	15-101
0971 4006A	Philips Polycarbonate Screw - M4x6	41-101
1101 0328	Connector Pin Contact	87-101
1101 0328	Connector Pin Contact	89-101
1102 4052	Optional Connector	75-101
1102 4201	Connector - 2p	87-102
1102 4201	Connector - 2p	91-101
1102 4202	Connector - 3p	87-103
1102 4202	Connector - 3p	89-102
1102 4203	CT Header - 4p	87-104
1102 4203	CT Header - 4p	89-103
1102 4204	CT Header - 5p	87-105
1102 4204	CT Header - 5p	91-102
1102 4205	CT Header- 6p	89-104
1102 4205	CT Header- 6p	91-103
1102 4207	Connector - 8p	89-105
1102 4207	Connector - 8p	91-104
1102 4208	Connector - 9p	89-106
1102 4211	CT Header - 12p	89-107
1102 4212	CT Header - 15p	91-105
1102 4468	CT Header - 10p	91-106
1102 4473	Ct Connector - 2p	77-105
1102 4497	Connector - 13p	89-108
1102 4497	Connector - 13p	91-107
1102 4506	Connector - 20p	91-108
1102 4559	Connector - 3p	77-103

Part No.	Description	Page and Index No
1102 4619	Connector - 2p	91-109
1102 4620	CT Connector - 2p	91-110
1102 4621	CT Header - 4p	87-106
1102 4621	CT Header - 4p	89-109
1102 4626	Connector - 9p	89-110
1102 4630	CT Connector	91-111
1102 4631	CT Connector - 2p	87-107
1102 4644	Connector - 9p	89-111
1102 5007	CT Header - 14p	89-112
1102 5276	Connector - 4p	87-108
1102 5301	Connector - 2P	91-112
1102 5311	Connector - 6p	87-109
1102 5331	Connector - 8p	91-113
1102 5409	Connector - 20p	87-110
1102 5409	CT Header - 20p	89-113
1102 5410	Connector - 22p	89-114
1102 5413	Connector - 28p	89-115
1102 5718	Optical Fiber Connector	87-111
1102 5718	Optical Fiber Connector	89-116
1102 6245	Connector - 2p	77-104
1102 6295	Connector - 2p	87-112
1102 6559	Connector - 60p	87-113
1102 6600	Connector - 8p	89-117
1102 6811	Connector	91-114
1103 1317	Connector	87-114
1104 0370	IC Socket - 64p	91-115
1104 0376	IC Socket - 40p - DICF-40CS-E	87-115
1104 0376	IC Socket - 40p - DICF-40CS-E	89-118
1104 0377	IC Socket - 28p	87-116
1104 0473	32p - IC Socket	91-116
1105 0087	Clamp	79-110
1105 0192	Locking Support	27-110
1105 0193	Nylon Stud	79-117
1105 0196	Harness Clamp	27-107

Part No.	Description	Page and Index No.
1105 0197	Wire Saddle	25-102
1105 0197	Wire Saddle	27-109
1105 0199	Clamp	17-108
1105 0199	Clamp	23-105
1105 0199	Clamp	27-108
1105 0199	Clamp	31-106
1105 0199	Clamp	63-108
1105 0199	Clamp	69-112
1105 0199	Clamp	71-103
1105 0199	Clamp	73-104
1105 0199	Clamp	77-108
1105 0229	Clamp	23-104
1105 0229	Clamp	53-109
1105 0229	Clamp	75-107
1105 0291	Wire Saddle	35-108
1105 0291	Wire Saddle	59-109
1105 0291	Wire Saddle	73-103
1105 0291	Wire Saddle	77-110
1105 0291	Wire Saddle	79-113
1105 0292	Wire Saddle	67-103
1105 0292	Wire Saddle	73-107
1105 0292	Wire Saddle	75-113
1105 0292	Wire Saddle	77-111
1105 0292	Wire Saddle	79-112
1105 0310	Wire Clamp	29-106
1105 0310	Wire Clamp	35-107
1105 0310	Wire Clamp	37-110
1105 0310	Wire Clamp	77-109
1105 0310	Wire Clamp	79-115
1105 0316	Clamp	67-104
1105 0316	Clamp	75-105
1105 0316	Clamp	79-111
1105 0328	Harness Clamp - ES-0505	59-110
1105 0328	Harness Clamp - ES-0505	69-107

Part No.	Description	Page and Index No
1105 0329	Clamp - ES-0510	29-102
1105 0329	Clamp - ES-0510	35-109
1105 0329	Clamp - ES-0510	37-111
1105 0329	Clamp - ES-0510	73-102
1105 0329	Clamp - ES-0510	77-112
1105 0329	Clamp - ES-0510	79-101
1105 0367	Spacer	77-114
1105 0413	Harness Clamp	67-105
1105 0413	Harness Clamp	75-115
1106 0193	Bushing - 7.9mm	27-111
1107 0392	Fuse (glass Case) - 6.3A - 125V	73-109
1107 0393	Fuse (glass Case) - 8A - 125V	73-108
1107 0472	Circuit Breaker - 250V/8A	79-118
1107 0554	Fuse (glass Case) - 17A - 125V	73-106
1204 1537	Dip Switch	89-119
1204 1570	Dip Switch	87-117
1204 2355	Micro Switch - AM51632A531	27-105
1204 2355	Micro Switch - AM51632A531	77-101
1204 2421	Main Switch	77-113
1206 0041	Lithium Cell - BR2330	91-117
1400 0382	Transistor - 2SA1037KR	91-118
1400 0392	Transistor - DTC114EK	91-119
1400 0398	Transistor - 2SC2412K	91-120
1400 0558	Transistor - 2SD780	89-120
1402 0688	Diode	87-118
1402 0688	Diode	89-121
1402 1122	Diode - MA159A	89-122
1402 1142	Diode Array - DAN217	91-121
1402 1191	Diode - 400V 1A	89-123
1402 1216	Diode - DTZ5.6B	91-122
1403 0308	LED - RED - TLR102A	87-119
1403 0308	LED - Red - TLR102A	89-124
1403 0828	Diode - SEC1901C	91-123
1403 0829	Diode - SEC1201C	91-124

Part No.	Description	Page and Index No.
1407 1596	TTLIC - SN74LS14NS	89-125
1407 1598	TTLIC - SN74LS125ANS	89-126
1407 1600	TTLIC - SN74LS244NS	91-125
1407 1741	TTL - SN74LS32NS	91-126
1407 2081	TTLIC - SN74LS08NS	91-127
1407 2143	TTLIC - 74F244SJ	91-128
1407 2147	TTLIC - 74F374SJ	91-129
1407 2187	TTLIC - SN74LS07NS	89-127
1407 2187	TTLIC - SN74LS07NS	91-130
1407 2218	TTLIC - SN74LS06NS	89-128
1407 2218	TTLIC - SN74LS06NS	91-131
1407 2231	IC - TD62308AF	89-129
1407 2231	IC - TD62308AF	91-132
1407 2261	IC - NJM2902M	89-130
1407 2344	IC - TD62382F	87-120
1407 2781	TTL - SN74AS04NS	91-133
1407 2783	IC - SN74AS00NS	91-134
1407 2833	TTLIC - SN74ALS273NS	91-135
1407 2896	TTLIC - 74F113SJ	91-136
1407 3008	TTL - SN74ALS244CNS	91-137
1407 3082	TTL - SN74AS244NS	91-138
1407 3083	IC - SN74AS373NS	91-139
1407 3285	IC - TC74HC08AF	89-131
1407 3380	HS-C2MOS - TC74HCT04AF	89-132
1407 3381	CMOS - IC - TC74HC4066AF	91-140
1407 3481	IC - SN74AS32NS	91-141
1407 3725	IC - TC74ACT138F	91-142
1407 3728	IC - TC74ACT244F	91-143
1407 3964	IC - CXD1175AM	91-144
1407 4091	IC - M66251AFP	91-145
1407 4092	IC - M66253FP	91-146
1407 4109	IC - CXD1175AM	91-147
1407 4145	IC - HD74LS07PF	87-121
1407 4209	IC - MC68340FE16C	87-122

Part No.	Description	Page and Index No
1407 4209	IC - MC68340FE16C	89-133
1407 4315	IC - TE7751	89-134
1407 4322	IC - TD74ABT374F	91-148
1407 4329	IC - M66255FP	91-149
1407 4330	IC - UPD70433GD-5BB	91-150
1407 4335	IC - M66236FP	91-151
1407 4336	PSRAM	87-123
1407 4696	IC - M48T58Y-70PC1	73-111
1407 4696	IC - M48T58Y-70PC1	87-124
1408 0595	IC - NJM2904M	91-152
1408 0598	IC - MB3773PF	89-135
1408 0611	IC - 3771	87-125
1408 0756	IC - NJM78L05VA	91-153
1408 0770	IC - L293D	89-136
1408 0874	Transistor Array - M54587FP	87-126
1408 0874	Transistor Array - M54587FP	89-137
1408 0877	Comparator - LM339NS	89-138
1408 1082	IC - M62354FP	91-154
1408 1085	IC - UDN2544B	89-139
1503 0095	Oscillator - P3 32.768khz	87-127
1503 0233	Oscillator - 16MHz	91-155
1503 0443	Crystal Oscillator - 20MHz	91-156
1503 0460	Ocsilator - 32.768kHZ	89-140
1503 0504	Ocsilator - TQC-246C-6R-3.6864M	89-141
1503 0518	Oscillator - CSA4.91mgg	87-128
1503 0563	Oscillator-9.83MHz040	91-157
1503 0569	Ocsilator - 19.66MHZ	89-142
1503 0581	Oscillator - at-49 32.8MHz	91-158
1601 7738	Resistor - 10 Ω x8 5%	89-143
1601 7739	Resistor - 4.7k Ω x2 5%	89-144
1601 7740	Resistor - 4.7k Ω -5% 1/32W	89-145
1601 7741	Resistor - 4.7k Ω -5% 1/32W	89-146
1601 7750	Resistor - 22k Ω ±5.00%	91-159
1601 7751	Resistor - 4.7k Ω ±5%	91-160

Part No.	Description	Page and Index No.
1601 7752	Resistor - 10k Ω ±5.00%	91-161
1601 7780	Resistor - 47k Ω ±5%	91-162
1601 7781	Resistor - 10 Ω ±5%	91-163
1601 8145	Variable Resistor - 5k Ω 0.5W	91-164
1602 0918	Filter - 270pf - Emi	87-129
1604 2585	Capacitor - 4.7µF	89-147
1605 0219	Capacitor - 1000pF 50V +80% -20%	89-148
1605 0223	Capacitor - 20pF 50V	87-130
1605 0223	Capacitor - 20pF 50V	89-149
1605 0223	Capacitor - 20pF 50V	91-165
1605 0322	Capacitor - 47pF 50V	87-131
1605 0322	Capacitor - 47pF 50V	89-150
1605 0343	Capacitor - 30pF ±5% 50V	87-132
1605 0511	Capacitor - 0.22µF 25V	91-166
1605 0573	Capacitor - 0.1µF ±20% 25V	91-167
1605 0636	Capacitor - 0.1µF	87-133
1605 0636	Capacitor - 0.1µF	89-151
1605 0685	Capacitor - 0.47µF	91-168
1606 1133	Capacitor - 22pF - 50V	89-152
1606 1135	Capacitor - 470pF 50V	89-153
1606 1139	Capacitor - 0.01µF ±20%	87-134
1606 1139	Capacitor - 0.01µF ±20%	91-169
1606 1208	Capacitor - 100pF ±5% 50V	87-135
1606 1208	Capacitor - 100pF ±5% 50V	89-154
1606 1450	Capacitor - 10pF 50V	87-136
1606 1450	Capacitor - 10pF 50V	89-155
1606 1452	Capacitor - 0.01µF 50V	89-156
1607 0280	Inductor - BLM41	91-170
1607 0477	Coil - BLM21A121SPB	87-137
1607 0494	IC - LALO4NA220K	91-171
1607 0551	Inductor - BLM32A07PB	87-138
1607 0551	Inductor - BLM32A07PB	89-157
1607 0663	Ferrite Core - TFC-20-10-10 (230V)	11-107

Part No.	Description	Page and Index No
1607 0663	Ferrite Core - TFC-20-10-10 (230V)	35-113
1607 0697	IC - AT-10	91-172
1607 0705	Noize filter - ACF51832-470	87-139
1607 0705	Noize Filter - ACF51832-470	91-173
1607 0706	Noize Filter - ACF51832-220	91-174
1607 0723	Noize Filter - N2012Z121	91-175
1607 0796	Noize Filter - ACF51832-470	89-158
1607 0903	Ferrite Core : HF70RH16x28x10 (230V)	83-105
1630 1101	Resistor - 100 Ω 1/4W ±5%	89-159
1630 1121	Resistor - 120Ω±5% 1/8W	87-140
1630 1121	Resistor - 120Ω±5% 1/8W	89-160
1630 1161	Resistor - 160 Ω ±5% 1/8W	87-141
1630 1161	Resistor - 160 Ω ±5% 1/8W	89-161
1630 1222	Resistor - 2.2k Ω ±5% 1/8W	89-162
1630 2100	Resistor - 10Ω 1/8W ±5%	87-142
1630 2101	Resistor - 100Ω 1/8W	87-143
1630 2102	Resistor - 1K Ω 1/8W ±5%	87-144
1630 2102	Resistor - 1k Ω 1/8W ±5%	89-163
1630 2103	Resistor - 10K Ω 1/8W	87-145
1630 2103	Resistor - 10k Ω 1/8W	89-164
1630 2106	Resistor - 10MΩ -1/8W	87-146
1630 2106	Resistor - 10MΩ -1/8W	89-165
1630 2152	Resistor - 1.5k Ω 1/8W ±5%	89-166
1630 2204	Resistor - 200k Ω ±5% 1/8W	89-167
1630 2206	Resistor - 20M Ω 1/8W ±5%	87-147
1630 2206	Resistor - 20M Ω 1/8W ±5%	89-168
1630 2221	Resistor - 220 Ω	87-148
1630 2221	Resistor - 220 Ω	89-169
1630 2222	Resistor - 2.2K Ω 1/8W	87-149
1630 2222	Resistor - 2.2k Ω 1/8W	89-170
1630 2243	Resistor - 24k Ω 1/8W ±5%	89-171
1630 2330	Resistor - 33Ω 1/8W ±5%	87-150
1630 2330	Resistor - 33Ω 1/8W ±5%	89-172

Part No.	Description	Page and Index No.
1630 2332	Resistor - 3.3k Ω 1/8W ±5%	89-173
1630 2334	Resistor - 330k Ω	87-151
1630 2334	Resistor - 330k Ω	89-174
1630 2362	Resistor - 3.6k Ω 1/8W ±5%	89-175
1630 2471	Resistor - 470Ω 1/8W ±5%	87-152
1630 2471	Resistor - 470Ω 1/8W ±5%	89-176
1630 2471	Resistor - 470Ω 1/8W ±5%	91-176
1630 2472	Resistor - 4.7k Ω 1/8W ±5%	87-153
1630 2472	Resistor - 4.7k Ω 1/8W ±5%	89-177
1630 2473	Resistor - 47kΩ 1/8W ±5%	87-154
1630 2511	Resistor - 510Ω 1/8W ±5%	87-155
1630 2511	Resistor - 510Ω 1/8W ±5%	89-178
1630 2561	Resistor - 560 Ω ±5% 1/8W	89-179
1630 2680	Resistor - 68Ω 1/8W ±5%	87-156
1630 2680	Resistor - 68Ω 1/8W ±5%	89-180
1630 2681	Resistor - 680Ω 1/8W ±5%	87-157
1630 2750	Resistor - 75 Ω 1/8W ±5%	89-189
1630 2821	Resistor - 820 Ω 1/8W ±5%	89-181
1630 3100	Resistor - 10 Ω ±5% 1/10W	91-177
1630 3101	Resistor - 100Ω - 1/10W	91-178
1630 3102	Resistor - 1k Ω 1/10W ±5%	91-179
1630 3103	Resistor - 10k Ω 1/10W ±5%	91-180
1630 3122	Resistor - 1.2k Ω 1/10W ±5%	91-181
1630 3150	Resistor - 15 Ω ±5% 1/10w	91-182
1630 3152	Resistor - 1.5kΩ - 1/10W	91-183
1630 3221	Resistor - 220 Ω ±5% 1/10W	91-184
1630 3222	Resistor - 2.2k Ω 1/10W ±5%	91-185
1630 3223	Resistor - 22kΩ - 1/10W	91-186
1630 3243	Resistor - 24k Ω ±5% 1/10W	91-187
1630 3273	Resistor - 27kΩ - 1/10W	91-188
1630 3330	Resistor - 33 Ω ±5% 1/10W	91-189
1630 3331	Resistor - 330 Ω ±5% 1/10W	91-190

Part No.	Description	Page and Index No
1630 3332	Resistor - 3.3kΩ 1/10W ±5%	91-191
1630 3334	Resistor - 330k Ω ±5% 1/10W	91-192
1630 3470	Resistor - 47Ω 1/10W ±5%	91-193
1630 3471	Resistor - 470Ω - 1/10W	91-194
1630 3472	Resistor - 4.7k Ω 1/10W ±5%	91-195
1630 3474	Resistor - 470k Ω ±5% 1/10W	91-196
1630 3560	Resistor - 56 Ω ±5% 1/10W	91-197
1630 3680	Resistor - 68 Ω ±5% 1/10W	91-198
1630 3681	Resistor - 680 Ω ±5% 1/10W	91-199
1630 4100	Resistor - 10 Ω ±5% 1/16W	91-200
1630 4330	Resistor - 33 Ω ±5% 1/8W	91-201
1630 4473	Resistor - 47k Ω ±5% 1/16W	91-202
1632 1002	Resistor - 10.0kΩ1/8W±1%	87-158
1632 3481	Resistor - 3.48k Ω ±1% 1/8W	87-159
1632 4641	Resistor - 4.64k Ω ±1% 1/8W	89-182
1632 5231	Resistor - 5.23k Ω ±1%	89-183
1632 5360	Resistor - 536 Ω ±1% 1/8W	89-184
1632 5621	Resistor - 5.62k Ω ±1% 1/8W	89-185
1633 0000	Resistor - 0Ω 1/10W:Jamper Chip	91-203
1633 1202	Resistor - 2.0k Ω ±5% 1/4W	91-205
1633 1602	Resistor - 16k Ω ±1% 1/4W	91-204
1633 1802	Resistor - 18k Ω ±1% 1/4W	91-206
1633 2701	Resistor - 2.7k Ω ±1% 1/10W	91-207
1633 3602	Resistor - 36k Ω ±1% 1/10W	91-208
1633 3901	Resistor - 3.9 Ω ±1% 1/10W	91-209
1633 4700	Resistor - 470 Ω ±1% 1/10W	91-210
1633 6800	Resistor - 680 Ω ±1% 1/10W	91-211
1633 7501	Resistor - 7.5k Ω ±1% 1/10W	91-212
1633 7502	Resistor - 57k 0HM ±1% 1/10W	91-213
1633 8201	Resistor - 8.2k Ω ±1% 1/10w	91-214
1633 9101	Resistro - 9.1k Ω 1/10W	91-215
1640 2470	Capacitor - 47µF ±20% 25V	91-216

Part No.	Description	Page and Index No.
1640 5101	Capacitor - 100µF ±20% 50V	87-160
1640 5101	Capacitor - 100µF ±20% 50V	89-186
1640 5109	Capacitor - 1µF ±20% 50V	91-217
1640 5338	Capacitor - 0.33µF ±20% 50V	89-187
1640 5470	Capacitor - 47µF ±20% 50V	91-218
1640 5479	Capacitor - 4.7µF ±20% 50V	91-219
1642 0470	Capacitor - 47µF ±20% 10V	91-230
1642 2470	Capacitor - 47µF ±20% 25V	91-231
1643 1470	Capacitor - 47µF ±20% 16V	91-232
1644 0100	Capacitor - 10µF ±20% 10V	91-233
1644 0330	Capacitor - 33µF ±20% 10V	91-234
1644 0470	Capacitor - 47µF ±20% 10V	91-235
1644 2330	Capacitor - 33µF ±20% 10V	91-236
1644 2479	Capacitor - 4.7µF ±20% 25V	91-237
1644 5109	Capacitor - 1µF ±20% 25V	91-238
1660 1100	Capacitor - 10pF 50V	91-239
1660 3101	Capacitor - 100pF 50V	91-240
1660 3150	Capacitor - 15pF 50V	91-241
1660 5102	Capacitor - 1000pF ±10% 50V	91-242
1660 7103	Capacitor - 10000pF 50V	91-243
1660 7104	Capacitor - 100000pF 50V	91-244
1660 9104	Capacitor - 0.1µF 25V	91-245
1901 0008	DRAM - 4M1X470NS G2	91-246
1902 0012	IC - SRAM - 64k X8 100NS 01	89-188
1902 0021	IC - SRAM - 1M - X8 - 100NS/G4	91-247
1902 0023	IC - SRAM 64KX8100NS G4	91-248

Part No.	Description	Page and Index No